How's the E-learning Baby? Factors Leading to Success or Failure of an Educational Technology Innovation

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Education is the area of enterprise that suffers the most from the baby and bath-water syndrome.
(adapted from John Dewey, 1920)

Why This Article?

At a recent conference, a lunchtime discussion was held to brainstorm some ideas on "books worth writing" in the field of educational/instructional technology. In order to stimulate our brain cells, the discussion leader suggested: "Think of the books you would probably be reading, or would like to be reading, in about three years' time." In a rather feeble attempt at a joke, but also stimulated by some conference sessions I had just attended, I suggested the title: "Why Did the E-learning Bubble Burst?"

Nobody laughed. On the contrary, the idea was taken quite seriously. We were all aware of ambitious projects, such as NYU Online, that had recently folded, and some of us had horror stories to tell from the corporate world as well. Someone made the counter-suggestion: "Why don't *you* write the book? But better entitle it something like what to do in order to protect the bubble and prevent it from bursting." Someone else suggested: "The Care and Feeding of Your E-learning Project." While the "bursting bubble" metaphor was seen as appropriate for a "post-mortem" analysis, some other metaphors, like "baby" or "pet bird," appeared more apt for this pre-emptive title. We shall see, as this article progresses, that both the "baby" and the "bird" metaphors are apt, for more than one reason.

The idea of the book germinated for a week or two and grew into an attempt to find out what had already been written on the topic. After all, why write a book if it's been written already? And, if there is no definitive book, is there a knowledge base of research and practice that can be drawn upon? My first act—almost a gut reaction in such cases—was to access ERIC. I used several combinations of search terms, such as "E-learning" and "failure," and came up with almost nothing—just a handful of documents that were not very enlightening. Then I tried the Web. Keying the above search terms into Yahoo produced a list of over two thousand hits. I analyzed the first two hundred or so.

Apart from discovering such nuggets of information as where to find an E-learning course to teach me all about metal fatigue and resultant failure of aircraft wings and fuselages, I located over 30 articles addressing the topic of interest. Reading these and following up cross-references, I soon had a knowledge base of over one hundred articles, papers, and PowerPoint presentations that addressed different aspects of why E-learning projects sometimes fail or how, in general, to make sure that they succeed. It may be useful to review representative examples of the extant literature, as a step towards a more scientific and systemic view of what's happening and what to do about it. But first, let's define E-learning as the term is used in this article.

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What Are We Talking About?
E-learning and Project Failure

What Is E-learning?

> It is hard to believe we were talking about online learning (OLL), Web-based training (WBT), or even technology-based training (TBT) just a short [time] ago. Since the introduction of the term E-Learning it seems that it's become the unifying term to describe all these fields. (Quote from the Learnativity Website: *www.learnativity.com.*)

The above quote illustrates the all-inclusive manner in which the term "E-learning" (or E-Learning, or eLearning, or e-Learning, or e-learning—there being no agreement regarding how to write the term) tends to be used. In the one hundred or so articles accessed, the term was defined nearly 50 times. Presumably, the other authors just assumed the reader already knew what it meant. But as I managed to count more than 20 *different* definitions in the 50 articles, the chances of an author's understanding exactly matching that of the majority of the readers are very low—unless the specific definition to be used is actually stated in the article. I shall not quote any of the definitions encountered in the literature, but simply present, in the form of Table 1, the definition that I plan to use.

Table 1. A structured definition of e-learning (plus some representative examples).

	(A) INDIVIDUAL SELF-STUDY Computer-Based Instruction/ Learning/Training (CBI/L/T)	**(B) GROUP COLLABORATIVE Computer-Mediated Communication (CMC)**
(1) ONLINE STUDY Synchronous Communication ("REAL-TIME")	Surfing the Internet, accessing Websites to obtain information or to learn (knowledge or skill) (Following up a WebQuest)	Chat rooms with(out) video (IRC; Electronic Whiteboards) Audio/Video-conferencing (CUSeeMe; NetMeeting)
(2) OFFLINE STUDY Asynchronous Communication ("FLEXI-TIME")	Using stand-alone courseware/ Downloading materials from the Internet for later local study (LOD-learning object download)	Asynchronous communication by e-mail, discussion lists or a Learning Management System (WebCT; Blackboard; etc.)

This definition stresses that E-learning may be a solitary, individual activity, or a collaborative group activity. It also suggests that both synchronous (real-time) and asynchronous (flexi-time) communication modes may be employed. This dimension of the definition is quite clear in the case of collaborative group learning activities, but requires a bit of a conceptual "stretching exercise" to be applied to individual learning

modes. Consider the learner as communicating (interacting) with a distant information source. Then, ask yourself whether that distant source is being accessed during the actual learning (in real-time). Or, alternatively, has the source been "acquired" (through download, which is equivalent to borrowing or buying a book chapter), so as to be available at the learning location for study at any time (flexi-time).

The definition adopted here is quite broad as compared to many one encounters in the literature—some limit E-learning to the right-hand (collaborative group learning) column. But it is more restricted than some others, that include such technologies as Electronic Performance Support Systems (EPSS) or Computer Supported Collaborative Work Systems (CSCWS). These are excluded here as, by their own specific definitions, learning is not the prime purpose. Although learning may (probably nearly always does) occur when an individual uses an EPSS, or a group interacts by means of a CSCWS, the prime purpose is to get some task, other than learning, accomplished. Any learning is incidental and not planned, so the design of these systems need not take learning issues into consideration.

One should also note that the structured manner of presenting the working definition reveals the true richness of possible E-learning systems and interventions. One of the beauties of the digital world we now live in is that we are not hampered, as much as in the past, by having to fit into specific categories. Not so long ago, in the media field, choices had to be made between one or another format or modality. For example, to present visual content, one had to choose between a slide show and a videotape. One choice gave the option of showing motion, but had very low levels of resolution. The other had high resolution but was static. What if one needed both at different points of a lesson? We ended up with the highly expensive and inconvenient multimedia carrel, equipped with every available type of audio, visual, and audiovisual presentation device. Now, all possible presentation alternatives are on the same CD-ROM, or online, accessible through just one presentation device—which incidentally is much more than just a presentation device, it computes as well. In the distance education arena, we had a similar situation. We tended either to go for individual study, as in correspondence courses, or group study, as in tele-courses or satellite-TV-delivered videoconferences. We could, of course, combine these modalities, but the TV and text components would have to be used at different times and in different places. Not so any more.

Thus, an E-learning lesson could be composed of activities from several of the four quadrants of Table 1. Indeed, the example given in the A-1 (Individual-online) quadrant is a case in point. The WebQuest methodology usually initiates with an individual exercise, sparked by an assignment and some initial Sites to visit, in which the learner surfs the Web in search of relevant information. Note that even this stage could be performed in small groups, say dyads sharing a computer or online together at the same time, but it is more common to set this up as individual study. However, there is more to it than that. The information gathered should be restructured and commented on by the learner—thus transforming information into knowledge that should then be shared with others. This last, knowledge sharing, stage is typically implemented in an interactive group environment. In the E-learning context, this would most often be an asynchronous discussion environment—anything in quadrant B-2. However, it is equally feasible, though less common in practice, to do the knowledge sharing via a Teleconference or Chat session—anything from quadrant B-1. And then we have the "hybrid" alternative of following the WebQuest exercise, performed as before by accessing the Web individually (as a homework exercise) and then bringing the acquired knowledge to share with colleagues during a conventional (non-E-learning) classroom-based discussion.

The variety of possible instructional designs for viable E-learning exercises is great. The variety of tools and technologies that may be used to implement these designs is also great. Multiplying these factors, the number of different E-learning systems that could be invented and implemented is very great. So, the number of possible reasons for E-learning systems to malfunction or fail is therefore very, very great.

Why Do Projects Fail?

Do all types of E-learning projects fail for the same reasons? The title of this article could well be (and initially was to be) "Why Do E-learning Projects Fail?" This was replaced by the current title not only to attract the reader with a more colloquial and less academically pompous title, but principally because the direct question in the originally planned title suggests to the reader that a direct answer will be found in the text. But this is not the case. As shown above, the variety of possible systems and their complexity (both

technical and organizational) make the answer to our question extremely complex. Some partial answers and many opinions will be presented and analyzed. But a definitive answer, based on evaluation and research studies, and valid for all the types of E-learning systems, is not yet forthcoming. Maybe there is a need for a book dedicated to the topic. However, there are some aspects that may simplify our quest for an answer, or answers.

The last chapter of my book *Designing Instructional Systems* (Romiszowski, 1981) discussed "Why Projects Fail." This chapter distilled, in some twenty Information Maps, a large amount of information, based on evaluation and research studies, on the multiple causes of failure in Instructional Design and Development (IDD) projects, and indeed in educational technology innovations in general. This information was organized around a systems-model composed of the several stages through which an instructional systems design and development project proceeds during its lifecycle and the typical activities executed in each stage (see Appendix to this article for a brief summary of the model). This chapter, the model it presents, and the detailed information on typical problems encountered and their causes, has "stood the test of time," having been used in practice for project planning and evaluation for a quarter century. I have recently had cause to review and revise the model. Quite surprisingly (or maybe not) there was very little revision necessary, despite the progress and severe psychological "climate changes" that have occurred in the field of learning theory and IDD during the elapsed time.

However, the model and the suggestions contained in this chapter do not cover all that may be relevant in the present case. Apart from instructional design and development, an E-learning project, to survive, must be sustainable in a given socio-economic or business context. This spreads the net somewhat wider—a further set of considerations, related to broader organizational issues, politics, and macro-economics, as well as the quirks of human nature and their influence on organizational culture, come into play as factors that may impact the success of the project. One aim of this article is to identify some of these broader issues as they are seen to impact the success and sustainability of E-learning in an organization.

There is also the question of the expansion of the E-learning field as compared to the typical educational innovation projects of twenty or more years ago. For example, the introduction of an innovation in educational technology then would typically affect students and teachers in some predictable ways. Typically, an IDD project would, to a greater or lesser extent, transfer some of the duties of the teacher to instructional media and materials. This changed the role of the teacher in some significant ways, for example, shifting the emphasis from being the sole source of knowledge to being the manager of a range of knowledge resources. It also changed the nature of the learning activities of the students—more emphasis on self-study and self-evaluation, student autonomy, and self-reliance, to mention just a few examples. All these changes were observed and submitted to decades of research and evaluation. The studies exist, can be accessed and analyzed, and general principles of reasonable reliability extracted.

In the new E-learning environment, the roles of teachers and students are also changing, but in different ways. The classroom teacher becomes an online teacher, having to master a series of new skills and competencies. The online student becomes a non-linear navigator through never-ending oceans of information—this also requires new skills and competencies. And the systems of instruction, that used to be tightly focused on tightly defined target populations in specific organizational contexts, are often now in the public-access sphere, so there is little knowing who may participate until they are actually participating. A further dimension of this is the global access of persons from all parts of the world to your one online course, and the other side of the globalization coin—your course is in competition for students with courses from all parts of the world. All this is rather new. There has been insufficient time to systematically research and evaluate all these trends. The database of information on how such new E-learning systems might develop problems or fail outright is very incomplete.

Diffusion of Innovations: Is Educational Technology a Special Case?

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The Phoenix Phenomenon

There are, however, some general observations that may be made and that may help to steer E-learning projects along a more secure path towards success and sustainability. One such area, appropriate as a basis for understanding of the general phenomenon, is the study of E-learning as an example of educational innovation, and educational innovation as an example of innovation in general. The research base on diffusion of innovations in society is rich and well established. How might E-learning fare in comparison to other innovations in the educational and training arena?

This particular avenue of inquiry was stimulated by one of the documents identified in my initial literature search on "E-learning" and "failure." Several relevant papers and presentations were located in the database of the Masie Center that contains materials used by presenters at the many E-learning-related conferences that the Center has organized and hosted in recent years. One particular document encountered was a PowerPoint presentation by Ellen Wagner, delivered at the Telelearn2000 conference (Wagner, 2000). This presentation, entitled "Strategies for Leveraging Learning Objects," might initially seem an unlikely place to find insights into the "Macro" issues of diffusion of innovations. After all, how much more "micro" can you get than the discussion of the topic of learning objects? However, the presentation dealt with this "micro" topic from several perspectives, including that of the claims of reusability, reliability, quality, and so on, of learning objects. Therefore, it touched on "Macro" aspects of the role of learning objects in making E-learning systems effective, efficient, cheap to develop, fast to build, and easy to maintain, all this guaranteeing their long-term sustainability. Heads up! One particularly relevant slide epitomized the core issues that really motivated this article, as it suggested that maybe E-learning was already well on the way to repeating the errors that had prevented other educational technology innovations, such as educational television, from realizing their potential. A somewhat simplified version of this slide, including only some of the examples included in the original, is presented in Figure 1.

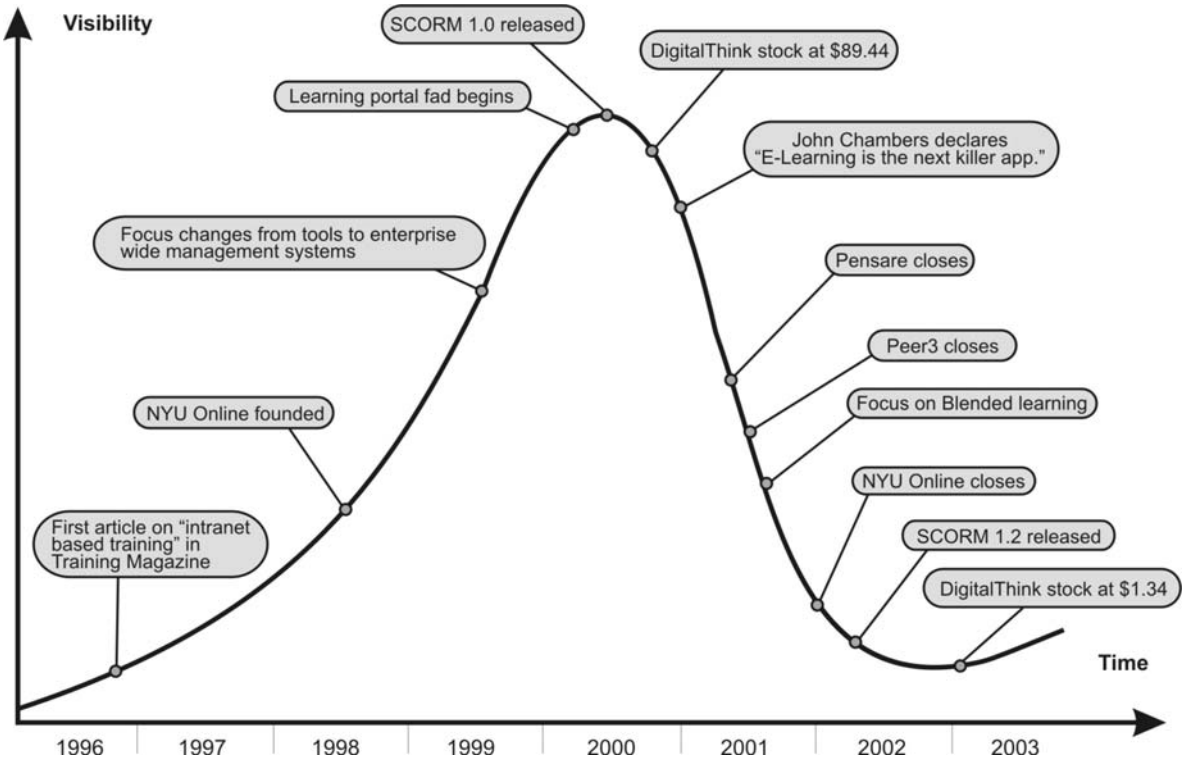

Figure 1. The E-learning "Hype Cycle." A simplified adaptation of a slide presented by Ellen

Wagner, Learnativity, TeleLearn2000 conference, organized by the Masie Center (www.masie.com).

This figure shows some of the key (success and failure related) events in the short history of E-learning as a mainstream innovation, still in the process of dissemination and adoption by the education and training communities. The events are placed on a graph that implies that the meteoric rise of E-learning visibility and popularity has already turned and been followed by an abysmal crash. I do not believe that the graph in this figure is meant to represent any exact quantitative measures that have been made. Rather, I take it to be a visual effect used to illustrate, in a particularly dramatic way, that all is not well on the E-learning front. However, the choice of the shape for this graph is probably not entirely the result of artistic creativity, but rather it suggests that the author/artist was well aware of the trajectory of many of the "star" educational technology innovations—and not only of recent years. Figure 2 serves to illustrate my point. This figure, taken from my own research performed between 1960 and 1970, shows the rise and fall of Programmed Instruction, as a mainstream innovation, in the United Kingdom during the 1960s. The graph shows the actual number of Programmed Instruction titles on sale in the UK, as researched for the data sections of the *APLET Yearbook of Educational and Training Technology* that I edited and compiled for the Association for Programmed Learning and Educational Technology (APLET) throughout that decade and later (e.g., Romiszowski, 1972). This yearbook listed all the Programmed Instruction materials offered on the UK educational and training markets by all publishers (including most USA and some Australian publishing houses, as well as all the UK based ones).

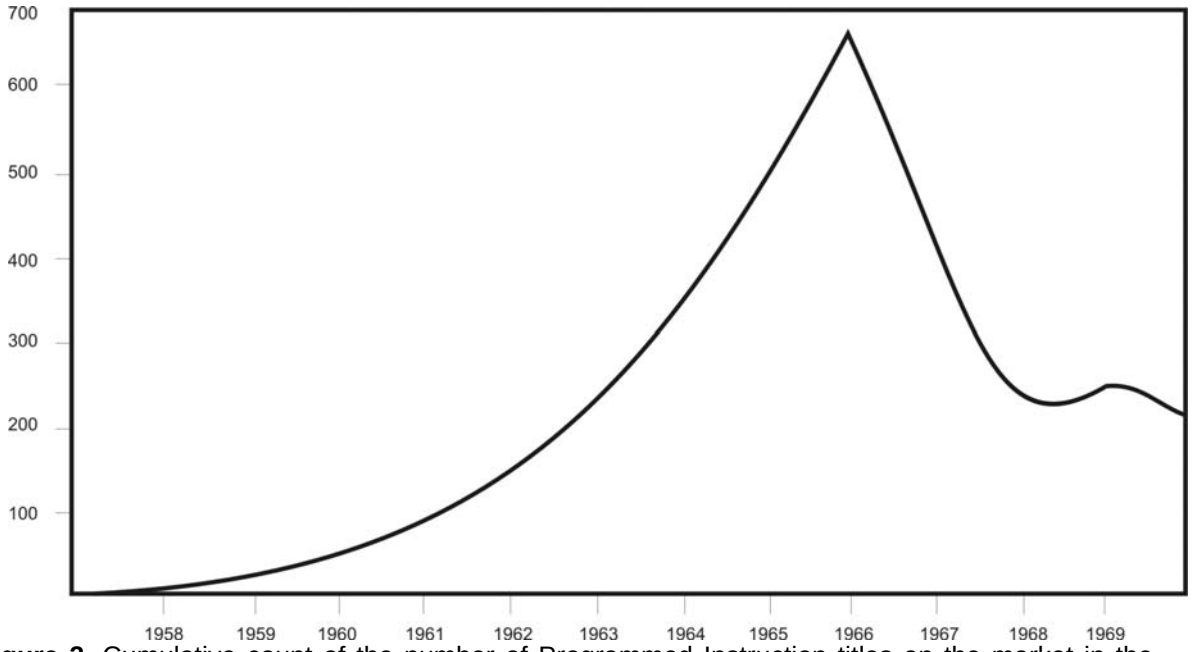

Figure 2. Cumulative count of the number of Programmed Instruction titles on the market in the United Kingdom through the 1960s (adapted from Romiszowski, 1974).

The similarity of shape of the graphs in Figures 1 and 2 is striking. Both start climbing slowly, then accelerate steeply, only to peak after a few years and then take a plunge almost as steep and deep as the ascent. Then, both "bottom out" at a much lower level and proceed to maintain that position, possibly climbing again, but much more slowly. This phenomenon has been observed in relation to many innovations in the educational field, not only but especially in relation to technology-based innovations. The intensity of adoption and use of instructional television (ITV) usage in USA schools through the 1950–1960 period

showed the same pattern of rise and fall, followed by a plateau at a much lower level of adoption and from there a much shallower upward trend. This phenomenon was studied in the ITV area by several researchers, including John Tiffin, who showed that the same pattern of rise and fall may be observed in other countries, thus seeming to be a generalizable phenomenon rather than a local accident. Figure 3 shows some data from Tiffin's research on educational television in Latin American countries.

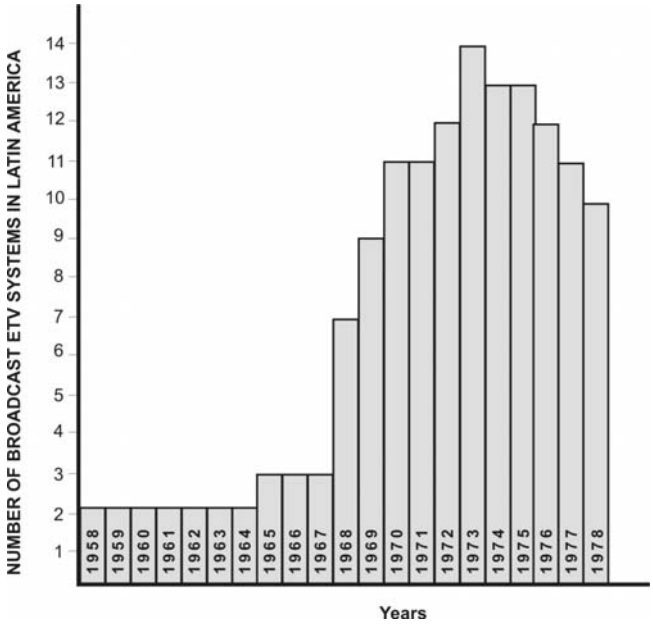

Figure 3. Total number of Broadcast Educational Television stations operating in Latin America, 1958–1978 (adapted from Tiffin, 1980).

The above-noted graph was published in a paper entitled "ETV: A Phoenix in Latin America" (Tiffin, 1980). The title refers to a name that was coined for the "rise-fall-plateau-rebirth" effect, first studied in relation to instructional television in the USA, where it gained the name "Phoenix Phenomenon" by comparison to the mythical Phoenix bird that is supposed to die by fire in order to be reborn from its own ashes. The ITV phenomenon, the Programmed Instruction phenomenon, and other educational innovations were likened to the Phoenix. The early adopters of the innovation, managed, through their enthusiasm, to obtain much support and acceptance from official bodies and private organizations, who then supplied the funding and organizational support for a rapid rise. However, the same early adopters were so inexperienced and over-confident that the bulk of the innovative projects were poorly designed and ineptly implemented, so that inevitably the expected benefits and returns on investment did not materialize. In time this was noticed by public bodies and private organizations alike, who then began to withdraw their support and cut off the sources of funding. The ensuing downslide was as rapid as the previous climb.

Typically, some of the better or more appropriately placed projects survive for longer, creating a plateau at a much lower level of market penetration than the earlier peak. And the project implementers, including any of the early adopters who managed to survive the head-chopping that usually accompanies the downslide, eventually learn from their own mistakes how (and when and where) it is possible to get the innovation to deliver the expected benefits. A process of slow and cautious rebirth of the innovation may then take place. Like the mythical Phoenix bird, the adopters of the innovation first kill it through inappropriate and unsustainable projects, in order to then allow it to be reborn in a more appropriate and sustainable form.

Tiffin's Latin American research, with figures to 1978 and published in 1980, shows a rise and subsequent fall in educational TV broadcasting. In his paper, Tiffin speculates whether there will be a

bottoming out and slow recovery (as was already the case in the USA), and if so, at what level of usage will Latin America "bottom out" and maybe start climbing again. I do not believe that Tiffin had the opportunity to follow up his research to verify what actually happened. However, being interested in this work and living through the 1980s in Brazil, I had the opportunity to follow up on the Brazilian subset of Tiffin's data (which represented almost half of the data points in his study). Sure enough, at least as far as Brazil is concerned, the Phoenix phenomenon was observed. The total number of ETV stations continued to drop until the mid 1980s, then flattened off to a plateau, but in the 1990s it started to climb once more, though at a much gentler rate than in the early days of euphoria and super-budgets.

The Classical Model of Diffusion and the Educational Technology Reality

One of the best known researchers and writers on the subject of the diffusion of innovations is Everett Rogers. His book, aptly entitled *Diffusion of Innovations* (Rogers, 1962, 1983), is used as a basic text in many universities and by many practitioners in the field. The book deals with the diffusion of innovations of any form in any context. It is a treatise on the "general theories of the diffusion of innovations." Much of the general theory can be summarized by the graphs shown in Figure 4. In an ideally "normal" group or society, an innovation would be adopted, initially slowly by enthusiasts and early adopters; and then, as the innovation is seen to be beneficial, it is adopted with increasing frequency. However, as the innovation "saturates the market," there are fewer people or organizations left to climb aboard, so the frequency of adoption starts to decline. The frequency of adoption would thus follow a normal distribution "bell" shaped curve, as shown in the lower graph in Figure 4. But on the assumption that all the earlier adopters of the innovation continue to be users, the cumulative number of adopters follows the classic "S" curve shown in the upper graph.

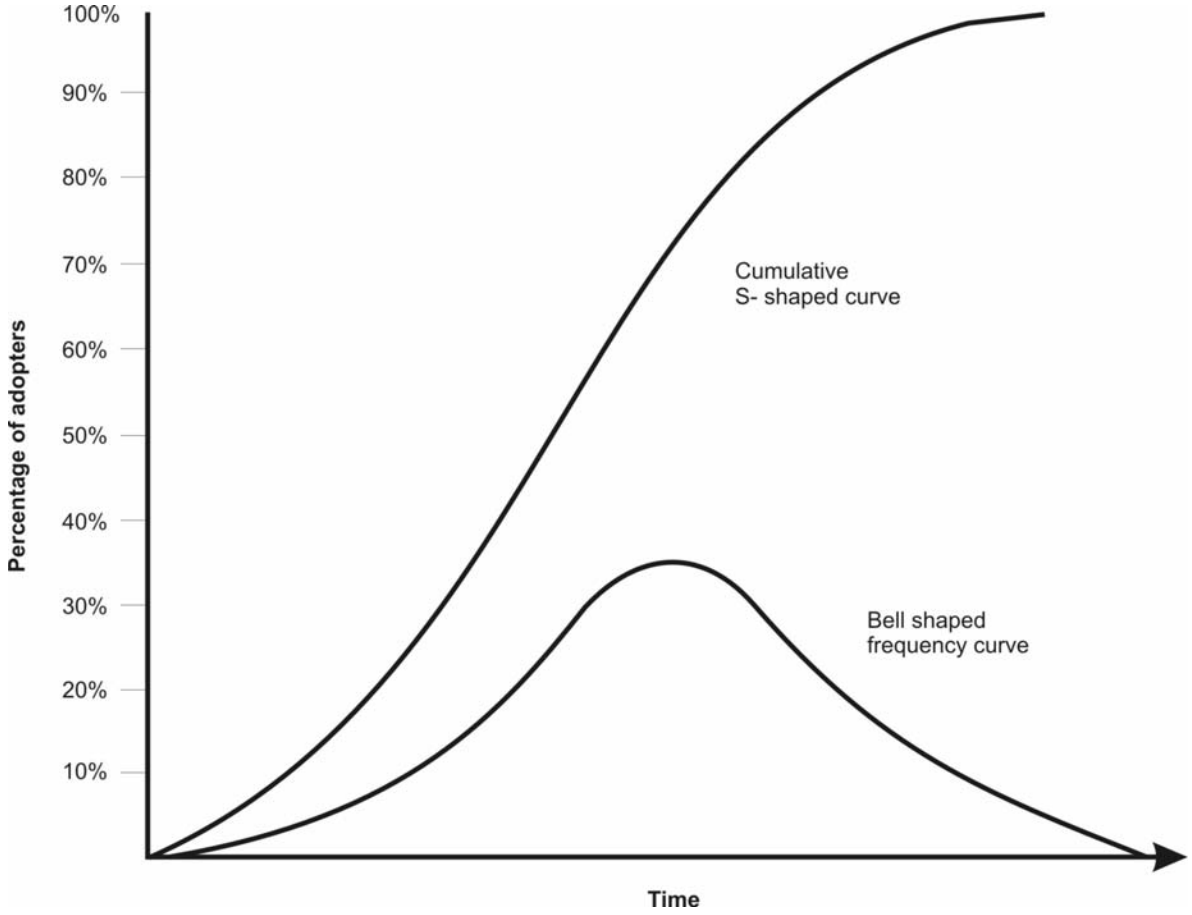

Figure 4. The classic "S-curve" of the successful dissemination of an innovation: The result of a "normal distribution" of adopters over time (adapted from Rogers, 1983).

Figure 4 is adapted from those shown in Everett Rogers's aforementioned book. The book gives many examples that are slight variations on the "classic" diffusion model. Two that are relevant to our present discussion are shown in Figures 5 and 6. Figure 5 illustrates the reverse of the adoption of a new product or service—the rejection or abandonment of a previously adopted product or service. Rogers (1983) presents such a graph together with the example of an effective anti-smoking campaign. The initial high level of adoption starts to decrease slowly as the campaign kicks in. Then, as the campaign acquires more "converts," who set about converting others, the rate of discontinuance increases and the total number of adopters (e.g., smokers) starts to decrease faster. Then, as the number of smokers in the population gets to be much smaller, there are few smokers left to convert, so the rate of discontinuance must slow down. Finally, it "bottoms out" at a level that represents the percentage of the population who will never give up smoking, whatever the consequences. Other examples of discontinuance abound. When one product or service is replaced by another more modern and better, the proportion of users of the older product or service will follow a curve as shown in Figure 5. A practical example would be the number of users of mainframe computers during the boom of the microcomputer networks and client-server configurations.

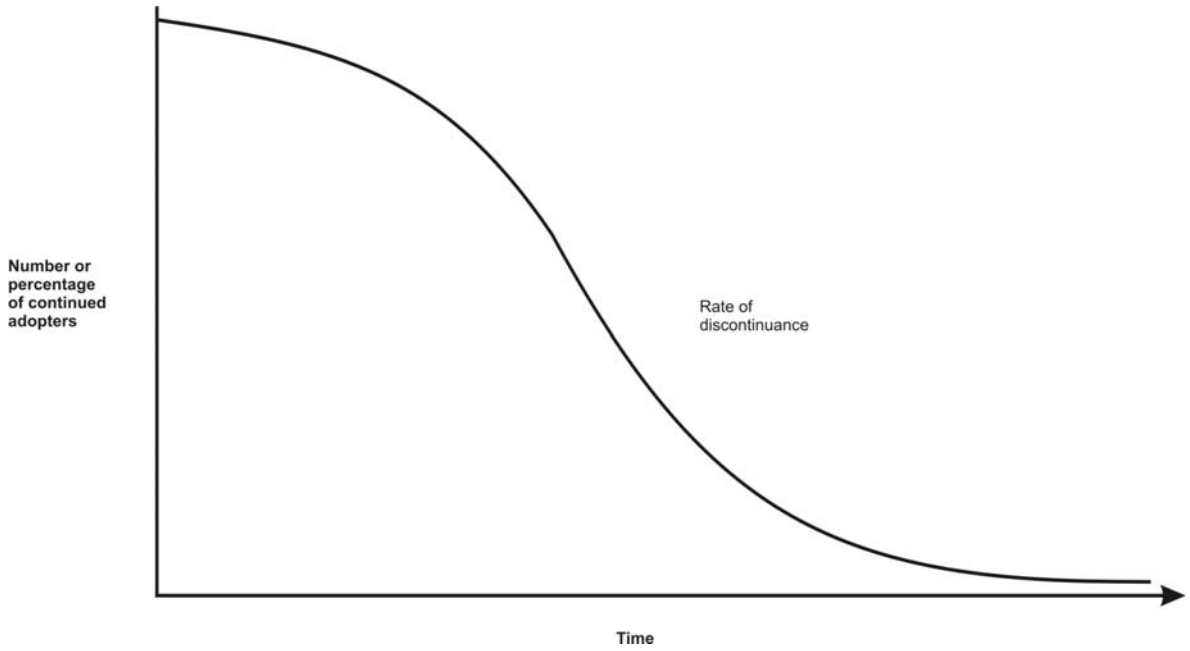

Figure 5. Discontinuance—the opposite of adoption (adapted from Rogers, 1983). (Result of an anti-smoking campaign, or replacement of one technology by another.)

Figure 6 illustrates the diffusion of a not-so-popular innovation, or one that is only appropriate for some of the population, or can be obtained only by a percentage of the population. For example, a new super-car launched by a luxury sports car company can be expected to produce a curve somewhat like that in Figure 6. As soon as the new car is launched, a few early adopters (who can afford it) buy it. Then, as these people spread the word and other marketing strategies are employed, the rate of purchasing increases and the total cumulative number of owners climbs according to the S-curve. However, the car has a very high cost, and this limits the possibility of ownership to a subset of the population. Therefore, the market penetration of this new car flattens off to a plateau at a level way below mass adoption of the product.

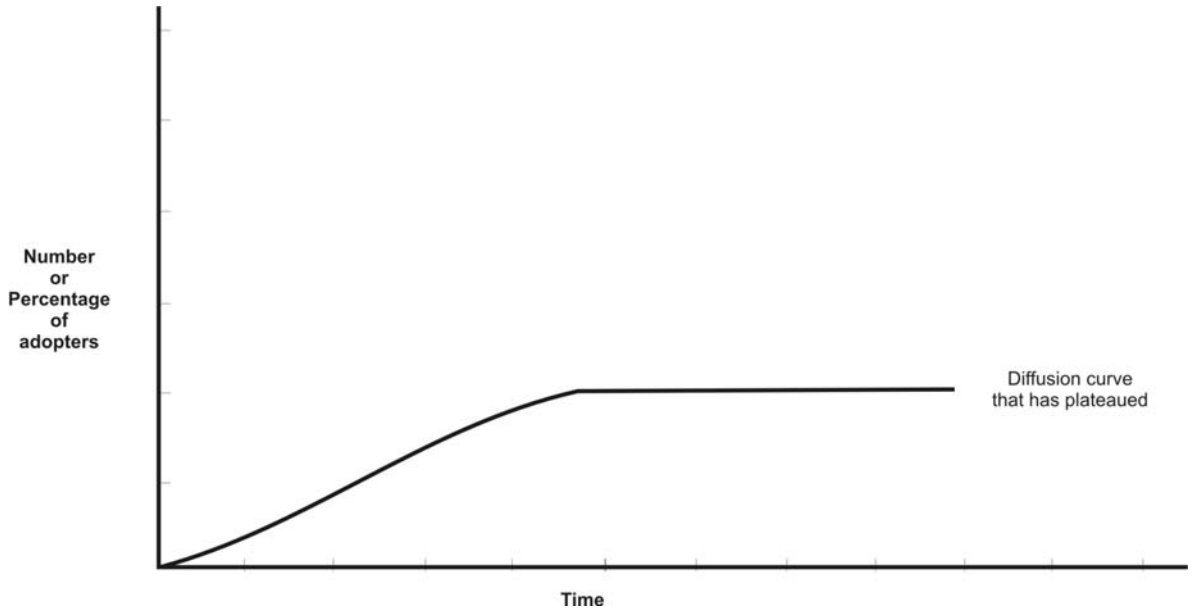

Figure 6. "Special Interest Group" innovation—partial, but faithful, adoption (could be caused by limited interest in, or limited availability of, a product/service).

Rogers (1983) discusses many more examples of special cases of the diffusion of innovations. This includes, for example, cases where the innovation slowed to a plateau, then after a time started to climb rapidly again. Such cases are explained in the real world by the presence of events that either stimulate or inhibit the adoption and spread of the innovation, but which exert only a temporary influence. An example quoted by Rogers (perhaps rather a strange one to be labeled as an innovation) is the history of aircraft hijacking which, apparently, has increased at different rates during different periods, giving a curve that is a combination of S-curve segments (Figure 4) joined by a several plateaux (Figure 5). Rogers explains this as the interaction of the tendency of hijackers to continue hijacking, tempered by a series of security measures that were introduced by the airlines. The introduction of a new security scheme halts hijacking, so creating a plateau. But, soon, the hijackers work out some form of neutralizing or bypassing of the security measures and the incidence of hijacked planes rises again. This leads the airlines to introduce new and more stringent security measures, creating another plateau in the trend—until someone works out how to neutralize the new measures, and the incidence of hijacking rises yet again.

What has all this to do with the situation of E-learning as an innovation? Or with the tendency of educational innovations to peak and drop? The typical diffusion curve observed in many cases of educational innovations is like the examples in Figures 2 and 3, or even closer to that shown in Figure 7. Figure 7 is a theoretical curve, suggested by Tiffin (1980) and based on the USA ITV experience and other studies, that predicts how most large-scale educational innovations are likely to diffuse into the educational system. This curve can be seen as a combination of all three of the theoretical curves shown in Figures 4, 5, and 6.

The graph in Figure 7 is divided into three phases. Phase one is the initial euphoric "flight of the Phoenix" up into the sky much higher than is wise, driven by the enthusiasm of the early adopters and fuelled by funding and support from a variety of stakeholders who have been led to expect certain benefits in return. Phase two is the tumble back to earth as the projects fail to deliver promised benefits and the stakeholders withdraw their support—the Phoenix flies too close to the sun and is consumed by flames. Phase three is the slow and careful rebirth of the Phoenix from its own ashes—the technical experts have learned from their mistakes that the world is not quite as predictable and well ordered as they thought (Nelson & Stolterman, 2003), and that each new project has to be not only well planned, but also most skillfully implemented and managed, if the theoretical benefits are to be reaped in practice.

Tiffin has shown this rebirth process to be erratic and bumpy rather than smooth and constant. This is possibly drawn from his many years of experience in Latin America, where every change of government (typically every four years) tends to result in a total halt in all projects and reversal of all policies of the previous government. Then, after a time, good sense prevails and the "good" policies of the past are reinstated, though dressed in the livery of the new order. This lack of political continuity, endemic to Brazil and many other countries in South America, would tend to produce the saw-tooth effect in the enlightened rebirth of our major educational innovation.

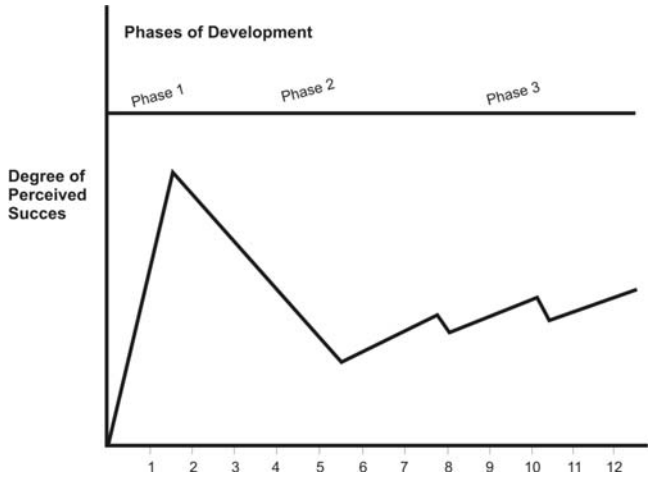

Figure 7. Typical diffusion pattern shown by many recent educational innovations (adapted from Tiffin, 1980).

However, the organized political discontinuity at Ministerial levels in Brazil may not be the only factor that will produce a bumpy road to adoption. At local school and school district levels in the USA, the UK, and indeed in most places I know, I have witnessed similar tendencies for projects that have some problems to be abandoned and replaced, rather than corrected and improved. In other areas of activity, such as manufacturing, a defective product line is redesigned and the defects eliminated. The product is only discontinued and replaced if the market has rejected it, that is, there is no felt need for the benefits it can offer. But in education, there is a strong tendency to do as John Dewey pointed out way back early in the last century: throw the baby out with the bath-water. The innovation that has some problems or inefficiencies, but also much good about it, is scrapped and replaced by some other approach that only later is found to have just as many, or even more, associated problems. Each generation of educators has a go at reinventing the wheel. And each generation ends up by shooting itself in the foot. Or, to get back to our other metaphor, there is a danger that each generation will behave like the Phoenix bird, unless the whole process is better managed.

The above discussion has been developed very much in the language of the public education system, or the civil service. However, much of the development and implementation of the current boom in E-learning is taking place in the private sector and in for-profit organizations. Can we expect similar patterns of growth and retraction there? Well, for sure, there are already quite a number of cases of private corporations that have "pulled in their E-learning horns," so to speak. One case I personally know about is that of the Xerox Corporation in Brazil, that invested quite heavily in a major E-learning initiative that did not even get off the ground. However, this initiative was to set up an educational portal and a full range of E-learning system design, development, and implementation services to be offered to client organizations. This was a corporation entering into competition with other education providers for a slice of the E-learning market. It is somewhat different from a business corporation that invests in E-learning for internal training and development purposes. But here, also, we are beginning to read ever more often that some projects have been closed down as the expected benefits or savings were not being delivered. Is this a natural phenomenon of a

small percentage of adopters "making a mess of things" by flawed design or incompetent management of a project, or is it rather that E-learning solutions have been applied where they never had any hope of delivering the expected benefits? Is the Phoenix phenomenon also apparent in the context of corporate E-learning initiatives? What can we do to avoid the Phoenix phenomenon in any context? This is where we turn to the literature on E-Learning successes and failures.

E-Learning Success and Failure: What Are Others Saying?

The intended principal focus of this article is on the "L for Learning," rather than "E for Electronic." This is contrary to the bulk of literature on the topic that, as Zenger and Uehlein (2001) comment, tend to stress the "E" rather than the "Learning." This trend will be apparent in the following literature review. However, when analyzing cases of success or failure, one has to look more broadly and systemically at all possible sources of problems. We shall do so in this section

One general observation may serve to introduce the following sample of the extant literature on success or failure of E-learning—there are many opinions, a few documented cases or examples, but very little systematic research. One other observation is that the opinions and case/example analyses expressed in the bulk of this literature can be classified into four major categories related to the topic of E-learning. In addition to those that emphasize the "**E**," or the "**L**earning" implied by the name, there are others that focus primarily on the project (or process) "**M**anagement" issues involved, and yet others that stress the organizational or personal "**N**eeds" that justify the project in the first place. Many articles, of course, address a mixture of these categories, but each article tends to emphasize one of these four issues more than the others, probably reflecting whether the authors are coming from the information technology, education, management, or performance improvement disciplines.

E Before L/M/N: Technology is the answer; what is the question?

> History is littered with failed attempts to "revolutionize" learning through innovative technology. Fortunately, these struggles have taught us one very important lesson: in order for technology to improve learning, it must "fit" into students' lives…not the other way around. As a result, E-Learning was born. (Clarke, 2002)

As I browsed the cache of literature I had identified, this opening paragraph of Clarke's (2002) article caught my attention. As I strongly agreed with the view expressed in the first sentence of this quote, I was interested in how the author would develop the idea implied by the second sentence. Was E-learning technology really born, like the mythical Phoenix bird, out of the ashes of previous educational technology disasters? What lessons, learned from the earlier "struggles," led to this rebirth of the Phoenix?

Reading on, I immediately became concerned by the author's "biographical sketch" of the first ten years' growth of the E-learning "baby" (or "bird"): (1) plain old "traditional" CBT (Computer Based Training) with added Internet Forums; (2) eBook (Online CBT); (3) eBook with added Mentoring; (4) LMS (Learning Management Systems); (5) eClassroom with Simulation; (6) Synergy E-Learning with Live Labs. This seemed to be a particularly technology-driven view of the process: The E-learning "baby" as a fast-growing set of technological tools. This was confirmed by the description of the "baby's" latest developmental stage as "the most advanced learning technology to date":

> This sophisticated asynchronous methodology combines three key elements of a successful E-Learning program: Prescriptive Assessment (to create personalized lesson plans), Live Labs (to allows students to have a hands-on, performance-based learning experience), and Multi-Sensory Learning Tools (to keep students engaged and improve retention).

Now, my initial concerns were confirmed. There is, after all, nothing particularly new about the creation

of personalized lesson plans. It was implemented into self-instructional materials design by means of diagnostic branching in some Programmed Instruction materials of the 1960s (the concept of "feed-forward" as a corollary to "feed-back"). But, in conventional instruction, this was the basis of the tutorial system of teaching practiced in many "traditional" European universities since their inception many centuries ago and only discontinued quite recently, when the "massification" of higher education rendered that approach no longer economically viable.

The incorporation of performance-based learning experiences has a history at least as long, being the basis of the medieval master-apprentice systems of professional development. In the self-instructional or distance-learning contexts, this was also a principle incorporated in well-designed Programmed Instruction materials. It has more recently been revived in the contexts of humanist, cognitivist, and constructivist instructional models under such guises as "experiential learning," "situated cognition," and "cognitive apprenticeship." The basic principle of relevant performance-based learning experiences remains the same, even if the details of its implementation vary.

And multi-sensory learning—together with near-synonyms such as multimedia and multichannel learning—has also been advocated, researched, and practiced in education since well before the invention of the computer. The very term "multimedia instruction" was listed in the first-ever thesaurus of major descriptors used to locate research in the ERIC database, signifying that by 1966 there was already a large and recognized body of research on the topic. And that was some twenty years before the invention of the multimedia digital technologies of today.

It is, therefore, safe to presume that the "Synergy E-Learning with Live Labs" technology is a new way of conveniently implementing these educational design principles in the practice of distance delivered education. But it is also safe to presume that the technology does not, in itself, offer any help in deciding when, or indeed how, to implement prescriptive assessment or performance-based experiences into a given course, or when/how to use specific sensory channels of communication. This decision-making process would, presumably, be performed by the course designers. And, as a result, they may then decide to use this specific, or some other, technological solution.

So what about this decision-making process? Surely, that is where we should find the keys to success! Surely, that is where the lessons from past struggles and failures will be applied so as to assure future success! What has Clarke (2002) to say on this? Here is a summary of the section on how to build a successful project in this field of work:

- Step 1: Design the E-Learning Product. Start with a powerful LMS platform and add a prescriptive Content Delivery System (CDS). Next, organize your content into three different types: Static (HTML Web pages), Multimedia (CBT, videos, and simulations), and Performance-based (hands-on labs).
- Step 2: Build the Content and Delivery Infrastructure. This begins with proper instructional design, and quickly becomes a content development bonanza. In concert, you should begin working with your internal Information Technology team to construct the LMS/CDS platform and host the performance-based content.
- Step 3: Create Comprehensive Student Services—Administrative Support (for online or phone questions concerning the operation of the system), Mentoring (for academic knowledge management, E-Mail, and 24 x 7 chat), and Technical Support (for configuration questions and general technical services).
- Step 4: Sell It!

So here we have a clear example of the emphasis being put first on the technology and only later on the pedagogy—the "E" before the "learning." And also the "E" before the establishment of a Need—we cannot classify the content into categories in Step 1 unless the content has been defined and selected before the execution of the process of "proper instructional design" mentioned in Step 2. But surely is this not putting the cart before the horse? This approach to design and development seems to be committing exactly the same errors that have led to the failure of so many earlier technology-based educational innovations: First, select the technology, then the content, and only then give attention to the practicalities of actually making it work.

Maybe it is also for this very reason that this approach requires final emphasis, in Step 4, on "selling." Rather than adopting a needs-based/problem-solving approach, Clarke proposes an entrepreneurial—and often risky—approach: First create the product and then try to create a market for it.

In another article that I would consider to be "E-dominated," Harris (2003) states that fewer than 50 percent of people-oriented, but technology-driven, interventions in the workplace, including not only E-learning, but also, for example, knowledge manangement (KM), customer relationship management (CRM), and many collaborative work systems, have been truly successful. She suggests that four interrelated issues account for this lack of success: Financial returns and other value on investments can't be demonstrated; use of the application is lower than expected; integration with core business processes or other workplace applications is limited or cumbersome; and the understanding of how to build processes that really work is low and limited to a few key individuals. She says:

> Knowledge management, content management, e-learning, and collaboration technologies are functionally sophisticated. However, they require strong process designs that leverage the power of the technology and volumes of well-designed metadata. Missteps are frequent. An example is taxonomy design. Most enterprises organize their internal (intranet) content by the owning business unit. They forget that if people don't know which business unit owns the information they need, automating that process doesn't help. Taxonomies must focus on use of knowledge rather than ownership of knowledge.

The example quoted here does focus on the "soft technology" design aspects of knowledge-based systems. However, taking this example as representative of the remainder of this article, we may conclude that the author approaches the issues of project failure very much from a technical vantage point. We hear the words of advice of a software/systems analyst/designer speaking to other software/systems analyst/designers. The implication is that the main reasons for the real-world failure of such systems have to do with technical design aspects. But the reasons for low financial returns and low levels of usage—two of the four factors initially mentioned as causes of failure—are more often than not related to human or organizational factors.

N Before E/L/M:
Is your project really necessary?

> IDC estimates U.S. corporations spent $1.1 billion on e-learning in 1999. Not all of the money was well spent, however. Lessons learned are beginning to emerge: Common among successful organizations is a well documented e-learning strategy that focuses on Infrastructure. (McGraw, 2001)

McGraw (2001) presents a business-case-based approach to the planning and implementation of E-learning initiatives. She argues:

> A successful e-learning initiative should reduce costs over the long term, improve individual and business unit performance, help maintain core competencies, and enable the organization to react quickly to competitive pressures and market needs. Therefore, an e-learning strategy should motivate people, improve productivity, enable skill development, and aid retention across the enterprise. Those outcomes are wide in range and require thoughtful consideration of the benefits and limitations of learning technologies and a comprehensive look at business, technology, and learning needs.

Although it is not clear why the second sentence should be a consequence of the first, both sets of requisites enumerated in the two statements would seem to be important to success and, most certainly, the broad and comprehensive look advocated in the third sentence is an essential part of a needs-based planning approach. McGraw continues:

> But ask an organization about its e-learning strategy and the reply will likely include only two components: content and delivery. Although content and delivery are important, they alone don't equal e-learning success. Focusing on

> content and delivery can create a myopic e-learning vision. Enter infrastructure.… Infrastructure is the permanent foundation on which e-learning is built…must address an organization's existing culture, governing principles, processes, and structures that will contribute to e-learning success or failure.

According to McGraw, the infrastructure's essential elements, or "building blocks" are:

- a company's overall business strategy and architecture;
- the "technical architecture" (for delivery, presentation, and management of learning);
- learning strategies (defined as "experiences and content made available to learners"); and
- learner identities, needs, and issues.

Let us examine McGraw's discussion of each of these four elements.

Taking a comprehensive look at the "business strategy and architecture" block involves addressing questions such as:

- Do large numbers of learners need access to learning?
- Are learners geographically dispersed?
- Do learners include individuals outside of the organization, such as customers?
- Does learning need to be deployed quickly to multiple locations?

This seems to be a reasonable, if only partial, account of a "front-end analysis" that aims to understand the problems to be solved and their multiple causes, in order to select an appropriate set of solutions. It is clear the writer sees E-learning as a practical solution to a set of practical issues that may (or may not) be present in a given project.

McGraw's "technical architecture" block raises a second set of questions:

- How will the organization integrate and manage e-learning across the enterprise?
- Which learning approaches and technologies will the organization embrace?
- Do (internal/external) learners have continual access to the corporate intranet?
- Do learners have consistent, reliable access to learning and information?
- What's the connection speed for remote users and is network bandwidth an issue?
- Does the program allow data sharing with such other enterprise solutions as finance?
- Are solutions standards-compliant, what are the security requirements, and so forth?

These questions, while addressing the technology component of an E-learning project, are mainly concerned with issues of course delivery and management, from an overall organizational perspective. The writer wants the answers. It is up to other technology specialists to supply them and, indeed, to work out which answers make most sense.

To develop a comprehensive "learning strategy," McGraw suggests one should perform the following tasks:

- identify and catalog existing learning content that meets the organization's business strategy and gaps for which new materials must be procured or developed;
- document the size of the learning community;
- track direct costs, indirect costs, and opportunity costs for current training options;
- define current competencies and learning levels—novice, intermediate, or expert;
- determine whether the intended distribution and presentation technologies are appropriate for conveying specific content and for reaching performance goals;
- select appropriate presentation and distribution methods for the infrastructure;
- define whether content is best deployed using e-learning or a blended approach;
- separate instructional material from reference and performance-support materials;
- determine methods and requirements for providing consistent feedback to learners;
- identify components of existing instructor-led courses that can be repurposed; and
- determine the time required to convert existing materials.

This rather long list of tasks has a strong project-management flavor. It does cover all three of the **N**, **L** and **M** components, but without too much detail, especially on the **L**. It does include some tasks that clearly imply the adoption of some form of systematic instructional design approach (though the details of the

specific approach are not clear). And, in general, the majority of the tasks are phrased in a very much content-related, as opposed to learning-related, manner—an aspect that the author had warned against in her own opening paragraphs.

The fourth of the infrastructure building blocks, "learner identities and needs," involves, according to McGraw, this further set of tasks:

- link learning to career development plans;
- identify user's individual technical abilities and familiarity with the technology;
- consider workspace limitations, such as noise and work distractions;
- evaluate content to ensure relevance for target learners; and
- analyze varied needs of the internal and enterprise-wide learner populations, such as customers and suppliers.

Once more, we hear the departmental/project manager, rather than the educational psychologist/technologist, speaking. This is not a problem in itself, provided the execution of the tasks is delegated to the latter. We are just analyzing the different vantage points, all relevant and important, from which the issues of E-learning success or failure may be viewed.

M Before E/L/N:
It's not what you do, but the way you do it—that's what gets results.

> New training technology has not delivered the goods in the past. Audio cassettes never had a great market. Video-based training did not set the world on fire. And programmed instruction became the pet rock of the training world….In the New Economy, today's jewels become tomorrow's jetsam. But e-learning can endure. The Internet makes the difference…. (Broadbent, 2001)

In an article, entitled provocatively "How to Fail at E-learning," Broadbent (2001) opens with the statement quoted above. The faith expressed in E-learning and the Internet suggests an "E-dominated" focus for the article. However, the body of the article tends to emphasize lessons learned that have much more to do with the implementation and management of HRD projects, independent of the specific technologies (or indeed of any technologies) used. The flavor of the article is better illustrated by the following list of tips for "HR managers, training directors, and consultants who are intent on *failing*" [emphasis added]. The "tips"are presented together with the present author's comments (in parentheses) of the areas of theory, research, and praxis that are implied by each one:

- "Think training, not business." (Stresses the importance of a front-end analysis.)
- "Promise the moon." (Stresses importance of a realistic and relational approach.)
- "Outsource everything." (Stresses importance of maintaining management control.)
- "Make it available and see if employees use it." (Lack of an implementation plan.)
- "Force e-learning on resistors." (Diffusion of innovations should be research-based.)
- "Don't evaluate." (No comment necessary!)

Later in this article, we shall be addressing all of these areas of theory, research, and practice, as integrated components of a systemic approach to the design, development, implementation, and management of E-learning (and most other) projects.

Some of the literature reviewed was harder to classify. A PowerPoint presentation entitled "Keys to Success in Project Managing E-Learning" (Shackelford & Aleckson, 2002) would seem, from its title, to be very much in the "M" category. In many respects it is, and therefore it is placed in this subsection. But, in addition, the presentation has a very strong technology flavor—however, in this case, the focus is on technology tools for project execution and management. The list below presents some of the principal causes of E-learning project failure discussed by the authors:

- Lack of ongoing support from management.
- Failure to set forth an E-learning strategy that takes into account the most pressing business needs.
- Failure to create an organizational context for producing E-learning learning.
- Failure to maintain customers and project sponsor commitment and involvement.

- Failure to plan for modularity and reusability in E-learning courses.
- Failure to adequately manage project scope, risks, and evolving requirements throughout the e-learning project.
- Failure to perform meaningful reviews to ensure an environment of continuous process improvement.

So far, the list of causes has a very strong project management flavor. The technology-focus appears in the "Keys to Successful E-Learning Projects" the authors recommend.

- Rather than prototype, produce real working product for each focus group session.
- To Increase Agility, Use Virtual Collaboration.
- Set up a Project Management Website.
- Think constantly in terms of Learning Objects, Templates, Repeatability, Reusability.
- Keep current on emerging standards—learn all you can about standards and SCORM (Shareable Content Object Reference Model).
- Manage scope, risks, and changing requirements through: clear-cut statements of work; graphical tools to depict roles and responsibilities; an adaptive, iterative E-learning product delivery process.
- Use software tools, e.g., context diagrams to depict roles in e-learning course development projects.
- Define Priorities: use a priority matrix to show the relative priority of time, cost, and scope/quality.
- Perform risk assessments for every project and quantify them based on: likelihood; severity of impact; degree of control.
- Take appropriate action to avoid or handle the most threatening risks: build a risk database for future use.
- Make the project review process an integral part of every E-learning effort.
- Schedule formal post-project review sessions at the end of every E-learning project

There are just some of these suggested actions, mostly connected with front-end risk analysis and (rear-end) project review and evaluation, that the authors mention without added descriptions of associated software tools to help you perform. But there are so few of these that one gets the feeling the authors just forgot to mention some of the relevant (and existing) technology-based tools that could also be employed for these tasks. However, despite the apparent fixation on computer-based project management, this approach can, I think, be classified as principally "M-oriented."

L Before M, N, or E: Students + Teachers + Materials = Knowledge Sharing and Skills Mastery

> E-learning has not kept pace with the development of increasingly rich IP-based delivery platforms because the e-learning experience is far too often puerile, boring, and of unknown or doubtful effectiveness. (Greenagel, 2002)

In a paper entitled "The Illusion of E-learning," Greenagel argues that many E-learning projects fail or under-perform for one or more of the following reasons:

(a) Developers don't seem to be aware of how people learn, so they use flawed models of instruction. Greenagel is particularly scathing in relation to **"presentation" models** ranging from streaming audio and video to PowerPoint programs that assume that most people can learn the content merely through aural and visual means, and **"programmed instruction/ tutorials"** frequently referred to as "traditional CBT." Although many of the capabilities of these are consistent with basic learning theory, the "content is mostly text and is frequently criticized as boring and puerile." One positive feature of this model is that the instruction is often built around quantifiable learning objectives. He has more positive things to say about the **"apprenticeship/coaching model"** which, combined with case studies, projects, or simulations, has "exceptional potential for learning complex competencies." Unfortunately, they are rarely employed, presumably because of the development cost and the fact that case studies and projects are not particularly scalable (this is a most important critique, in my opinion). Finally, he is also in favor of the so-called **"hybrid models"** that combine E-learning with classroom or lab sessions, as these can be particularly productive provided "the learning model for each part has been carefully thought through."

(b) A flawed model of cost-effectiveness is used, basing return on investment (ROI) in the technology and in courseware development, rather than on valid measures of effectiveness developed from analysis of organizational and individual performance goals. Corporations are more interested in throughput and low unit cost, so solid measures of effectiveness are infrequently developed or applied. In the absence of emphasis on measurable outcomes, there is little incentive to value anything but "throughput" and low unit cost. The cost of development is high, so bad (cheap) programs drive out the good ones in the absence of any commitment to measure effectiveness. Partly due to this, dropout rates for E-learning are much higher (about 70 percent) than for standard college instruction (about 15 percent).

(c) A flawed approach to the understanding of technology in education. The available platform drives the instructional strategy, which may not be appropriate to the learning style of trainees or to the learning objectives. The strategic planning process is often driven by technology, not by corporate objectives. Greenagel argues: "To me, that's backward. Begin with the organization's objectives, extract the competencies required to attain those objectives, examine the constraints (time, distance, trainee's experience, corporate culture, etc.), and then you can begin to outline the kind of learning experiences that will be necessary to develop those competencies. Only at that point (or when describing the constraints) do you consider the technology and whether its capabilities and limitations are congruent with the learning experiences necessary to achieve the outcome."

(d) A distorted valuing of technological solutions for the planning of education. The development of standards such as SCORM (Shareable Content Object Reference Model) and IMS (Instructional Management System) is "a distraction as these are not standards that treat learning outcomes, but instead deal with tagging, coding, and indexing Learning Objects to facilitate reuse of digitized training materials…. Implementation of SCORM specifications can help learning technology to become reusable, interoperable, stable, and accessible. Who would be opposed to standards, except there is nothing in any of those standards that focuses attention on the *effectiveness* of the Learning Objects."

(e) Failure to take into account that effective E-learning experiences for complex competencies are rarely scalable. What works in a known and predictable manner on a small scale may work quite differently on a much larger scale, or may not even work at all. This so-called "scale effect," generally well known to engineers, economists, biologists, and many other professional groups, seems to be largely unknown or ignored in the technology-based education projects—until problems arise, of course. We shall see some examples of such problems in real life distance education projects, presented in the next section of this article.

Lastly, Greenagel makes a strong plea for the matching technology and the design of college level or corporate E-learning courses to what is known about adult learning styles:

> Earlier generalizations that informed much of the best practices of CBT remain largely valid (self-paced, individualized tracks, frequent practice, immediate reinforcement, emphasis on outcomes), but Howard Gardner's work, Multiple Intelligences, stimulated a lot of rethinking and research into learning styles. Among the most suggestive conclusions to emerge from that work are these:
>
> - People have different learning styles.
> - The subjective difficulty of the material (i.e., for that trainee) affects the learning style.
> - On complex topics/judgment issues, people need to get comfortable, to mess around with the topic before they can understand it.
> - Understanding does not necessarily flow in a linear manner from breaking the task/object into simpler component parts.
> - Learning is often a gradual process that happens through a series of shaping activities, which are not always instructor initiated.
> - The coaching process recognizes this, and so do many lab courses where we expect student skills will develop over the semester without explicit focus on those skills.
> - Learning communities work; there is a social as well as cognitive dimension to learning.
> - Students transform the information they get from instructors and texts into meaningful knowledge through conversations, arguments, lunches, discussion groups, and other real-world activities.

The question of using adult learning theory in the design of E-learning is also discussed at length by Willams (2002) in one of the few papers on the topic that actually reports some systematic research. Williams observes:

> Despite the attention focused on the advantages of Web-based education and training for adult learners in adult education organizations, the adult learning elements within the instructional design of Web-based training/instruction have not been examined. The omission of this core factor can impede the successful delivery of instruction via the Internet. Therefore, the training may not be effective, which will cause major implications for the learner and the organization.

There are several characteristics that lead to the effective design of instruction. These characteristics of effective instruction are based on a number of adult learning principles. These principles are known to supply practitioners with the foundation necessary to design effective face-to-face instruction for adults. The issue raised in the study was whether these same principles apply to the design of E-learning:

> Although teaching and learning via the Web is growing at a steady pace, the current literature on Web-based training/instruction focuses primarily on the technical elements of design and not the adult learning principles that are necessary for effective design of adult learning. In the area of Web-based training/instruction there is a lack of study surrounding adult learning and Web-based training/instruction design. This lack of research reference could lead to the omission of critical principles with the design of Web-based training/ instruction, which, in turn, can lead to major problems in effectiveness.

The purpose of this study was to determine the adult learning principles that are critical for effective Web-based instructional design, barriers to effective Web-based instructional design, and the practices of professionals who design Web-based training/ instruction. The study was conducted in three phases:

- The conduct of face-to-face and online individual interviews to determine and verify the content for an assessment instrument of Web-based courses.
- The development of an online assessment instrument to determine the application of adult learning principles in the design of Web-based training.
- The analysis, via electronic document review, of ten Web-based training courses designed by instructional designers in business and industry and higher education settings.

The results of the study generated a list of no less than 36 instructional design principles based on the application of adult learning theory, principles, and the praxis of the subjects who participated in the study. These principles may be classified into a smaller number of major categories as follows:

- Course content and methodologies should be based on the learners' objectives and entry knowledge, skills, habits, and preferences (content-specific knowledge and skills and also general learning skills, styles and preferences) as well as on the goals and objectives of the organization.
- Course structure, sequence, and methodologies should be designed on the basis of existing knowledge regarding adult learning, including the selection of appropriate forms of interaction with peers and teachers, appropriate and meaningful examples, use of relevant illustrations and cases, use of study guides allowing for self-direction, allowing for the sharing of personal experience, etc.
- Where appropriate, case study and simulation exercises, based on known real-life contexts and problems should be incorporated in the course.
- A variety of feedback instruments and methodologies for self-evaluation, peer-evaluation, and alternative forms and opportunities for review and re-learning should be provided.
- A variety of opportunities and methodologies for interaction with peers and with tutors or faculty should be provided.
- Courses should be designed so as to bear in mind the wide variety of ages, life stages, professions, value systems, life experiences, goals, and motivations that may be expected in an adult group.

In general, these design principles are in congruence with those that may be found in the theoretical literature on adult education. Williams makes some comments on the application of these principles to the design of E-

learning and Web-based training systems, but the research stops short of evaluating their effectiveness in practical application.

Another important paper (O'Fathaigh, 2002) questions current E-learning trends from the learner's vantage point, but concentrating more on aspects of access and equity than on instructional design.

> The new e-learning technologies, certainly offer us the rich promise and potential of formal/informal learning delivery at any time, anywhere, on any topic; international courses, fully inter-cultural, with learners-teachers drawn from all over the world: A truly global network/system of learning….This is the exciting concept, but this rich and engaging promise does not (may not) automatically lead to effective and inclusive lifelong e-learning, nor indeed does it guarantee that e-learning ICT technology will always be used in these ways. Without careful management of the learning process, the application of best principles and practices in e-learning design strategies, effective attention to staff development, the provision of extensive learner support services, and a careful focus on a range of socio-educational issues, the promise may/will lead to a widening gap in access between rich and poor, young and old, employed and unemployed and computer literate and illiterate persons.

O'Fathaigh quotes other writers on this topic who have commented that "cherry picking by large corporate raiders and niche entrepreneurs potentially threatens both on-campus and distance education not-for-profit activities" (Lentell, 2000, p. 37) and that "the death of open education is here. It does not matter whether you are close by or on the other side of the world. Your competitors are cherry-picking easy-to-deliver, high-demand and lower-cost courses" (Zastrocky, 2000).

In a recent research article in the *Journal of Asynchronous Learning Networks*, Hanna (1998) comments:

> …the combination of access and availability demands, costs, application of content/learning to work settings, new technologies and other factors are radically changing the environment for higher education and these factors are opening the door to emerging competitors and new organisations that will compete directly with traditional universities and with each other, for students and learners.

His outline of emerging third-level organizational models ranges from extended traditional universities, technology-based institutions, corporate universities, university/industry strategic alliances, degree/certificate competency-based universities, to global multinational mega "open" universities.

Yet one other learning-system related issue that is of prime importance in the context of ascceptance or rejection of E-learning (at least in the higher education context) is the work load that it creates for students and staff. Doughty, Spector, and Yonai (2003) report on a major two-year study on this subject. The research involved maintaining a log of all time spent on all tasks associated with the conduct of E-learning courses on campus. Courses from three schools at Syracuse University, using WebCT or Blackboard as the delivery platforms, were thus analyzed. Among the wealth of detailed information reported in this lengthy study (one of the few systematic research studies located) is that while students spent similar or only slightly longer time when studying online versions of courses, faculty and other support staff typically spent about twice as many hours teaching online versions of courses as they did when teaching the regular campus based versions of the same courses. Given that, at least in this study, the online courses tended to attract lower enrollments, the time-related findings have profound implications for the economic viability of large scale provision of online courses as an addition to the regular campus based menu of courses.

E/L/M/N: The Integrated "Systems" Approach

> Failure in E-learning can occur at three interlocking levels: the product level (poor course design; inadequate technology infrastructure); the learner level (poorly prepared learners, lack of motivation, no time); or the organizational level (low managerial support, lack of reward structure). (Phillips, 2002)

Phillips expands this tri-partite model of the sources of failure as follows:

Product Level

—Poor course design (chunks of theory and facts with very little real-life application).
—Poor e-classroom design (complex navigation, chat rooms that crash, ugly interfaces).
—Ill-performing technology (poor audio, jerky video, interrupted data downloads, etc.).
—Poorly managed course social interactions (untrained or untried online moderators).
—Slow instructor/mentor response times.

Learner Level (Internal Context)

—Lack of time
—Low interest in subject matter
—Low motivation for learning
—Poor self-study skills
—Poor time management skills
—Disrupting life interruptions (divorce, shift change, parental duties)
—Lack of necessary e-skills (downloading files, subscribing to e-mail lists)
—Psychological resistance to losing F2F learning perks (social networking, travel, snacks)

Organizational Level (External Context)

—Poor internal marketing of courses and events
—Lack of clear reward structure
—Failure to provide quality learning environment
—Failure to provide quality learning equipment
—Failure to provide managerial feedback and support of learning
—Failure to provide time on-the-job to train
—Corporate-wide lack of dedication to a learning culture
—Blanket mandate of e-learning as the new-new thing; removal of all other methods
—Failure to match Internet training to its most appropriate purposes

This list of possible failure factors is the closest thing to an overall, total systems, analysis of the E-learning phenomenon and possible sources of problems that was located in the literature so far located and analyzed. Although the analysis is presented in three subsystems, or "levels," the list really covers (albeit scantily) all four of the E, L, M, & N foci that we used as an organizing structure. Much could, however, be added to this list. Even a cross-referencing exercise that compared this list with the many partial lists analysed in the preceeding pages would produce an integrated list well over twice as long. However, one limitation on the value of such a list is that it is largely composed of the opinions and unsubstantiated insights of a large number of practitioners, or in some cases, non-practicing theoreticians.

Conclusion:

Toward a Research Agenda and a Praxis Methodology

Only some of the principles that have emerged from the literature analysis have any significant research to back them up. This can be seen as a limitation, but also as an opportunity to structure a research agenda that may build on what has been established and verify what has not. Another limitation of the literature analyzed is that very little of it presents detailed accounts of actual projects that have failed or exhibited serious problems. The writers reviewed all refer to the phenomena of high dropout rates, student dissatisfaction, and puerile and irrelevant learning materials, lack of return on investment, to name a few problem areas actually cited in the literature reviewed. But the specific cases where these problems have been observed are not documented, or at any rate, I have not yet managed to locate the documents if they do exist. This makes it difficult to go beyond the generalizations reported here and examine the actual problems in their context, thus making some judgments about the underlying causes of the problems.

Maybe it is too early yet in the history of E-learning (or whatever this phenomenon is to be called in future

years) to expect a rich and well organized research knowledge base. However, it is not too early to plan for it. An example of an approach that appears applicable to and promising for the current case, is presented here. This is the fruit of a recent project involving the design and implementation of an "Open School" secondary education system at a distance in rural areas of Mozambique. In order to predict the problems that may be anticipated and to review how others have addressed them, a review of the literature on Open School projects in developing nations was performed. The literature on this is not extensive, but it does exist. And, luckily, much of this literature is structured in the form of project evaluations and is available in two recently edited books (Bradley & Yates, 2000; Perraton, 2000). A review of just these two books yielded evaluation data on some 15 projects in 12 countries. Although the chapters on each project were not written to any standard format, they all were evaluation studies, so they all identified problems where they existed as well as praising what was working just fine. In addition to identifying the problems, the reports sometimes also positively identified the causes, or at least speculated on the probable causes.

An initial review of literature on Open School projects was performed, using the above mentioned books and some other sources. This was organized in a particular manner that should be of special use later in the project. As the study is seen as principally supporting the decision-making process of those involved in planning, implementing, and managing the intended Open School project, the literature review should be performed from the vantage point of project planners, implementers, and managers.

Table 2. "Open School" distance education projects: Structured literature review of problems and causes.

	Problems in the Design/Decision-Making Process (in 4 levels)				Problems in Project Execution	
SPECIFIC CASE STUDY, COUNTRY, AND SOURCE	**1. Need/ context/ constraints/ risks**	**2. The system macro-design**	**3. Sub-system micro-design**	**4. Logistics & infrastructure**	**Project planning & implementa-tion**	**Project management & evaluation**
National Open School (NOS) India (Perraton, 2000)	Low impact due to inadequate resources for size of the need				Lack of training for the teacher counselors and instructors	No involvement of local govt. and no monitoring or evaluation
Malawi, Zambia, & Zimbabwe Open Schools (Perraton, 2000)	Salaries too low so grading of work is not done			Many radios not working due to lack of parts, etc.	Production and distribution of materials late	Timetable not in line with student available times
Interactive radio in many regions and countries (Perraton, 2000)	Most often not sustainable after the external funding stops		Materials are rejected by some teachers due to "behaviorist" style			
Andrah Pradesh Open School (APOS), India (Yates, 2002)		Scale effect: new problems appear as system grows			Lack of training for facilitators & tutors	Project mgmt. & evaluation not adequate to task
Botswana College of Distance and Open Learning (BOCODOL) (Yates, 2002)	High dropout due to student's lack of time for study	1. Scale effect 2. Competes with other services	Students refuse to be responsible for their own learning		Production and distribution of materials late	
Department of Non-Formal Education (DNFE), Thailand (Yates, 2002)	High dropout due to student's lack of time for study		A/V media not integrated into teaching process		Lack of training of group facilitators	Poor monitoring, supervision, and administration
Telesecundaria, Mexico (Perraton, 2000)	Teacher retention poor due to low salaries and poor work conditions	Single-teacher for all subjects; model does not work that well		Inflexible timing and curriculum due to broadcast TV constarints		

In order to do this, the literature review has been organized around the general instructional analysis,

design, development, implementation, and evaluation model (Romiszowski, 1981, 1996), also often referred to as a "Systems Approach." (An outline of this approach is presented in the Appendix to this article.) The Open School literature was reviewed by identifying the "lessons learned" and classifying these "lessons" into the cells of an overall systemic planning model. In this way, we may build a pattern of what the generally available literature suggests as "known problems" (and possibly also some "solutions") at various stages of the overall process that takes a project from initial conception to full-scale sustainable operation. The results of this initial literature review are presented in tabular form in Table 2. As may be seen from this table, the problems encountered most frequently—and also the problems that most undermined the success and sustainability of other similar distance education projects—tend to be clustered more thickly in the areas of overall project conception and then project implementation and management.

Some key issues that have been found to most frequently cause problems of success and sustainability were identified from this matrix table. The general idea is that once field data have been collected on any new or ongoing project, it will be possible to return to the matrix table and plot them according to their causes in the appropriate stage of the project lifecycle as reflected by the structure of the table. Key issues that are seen as possibly threatening the success and sustainability of the project are selected in order to evaluate the probability that these problems and their causes may actually appear in the current project. It may also be possible to suggest some locally viable "solutions" that may address these issues. The study may also add further "questions" to some of the cells of this matrix, especially in those areas where the initial literature review has left a lot of blank space.

The matrix will then act as a guide to further review of the literature in areas that are identified as of particular importance to the success of the project and where the initial review has failed to generate guidelines. Thus, the "map" may be used as a planning document for a particular project and also as a dynamic, updatable review of the literature. It may also be used as a communication document between researchers, or managers of different projects, in order to pool separate findings in one structured database.

Could such an approach be used in the field of E-learning research? Most certainly. It should be possible to plot a similar "map" of the problems that have been encountered in a range of actual projects and initiate the preparation of a similar table. Then, as further case studies are encountered, the table could grow and become more powerful as a decision-making support tool. Also, different researchers and practitioners, as they get to know of the existence of the tool, can contribute their own findings in an organized manner.

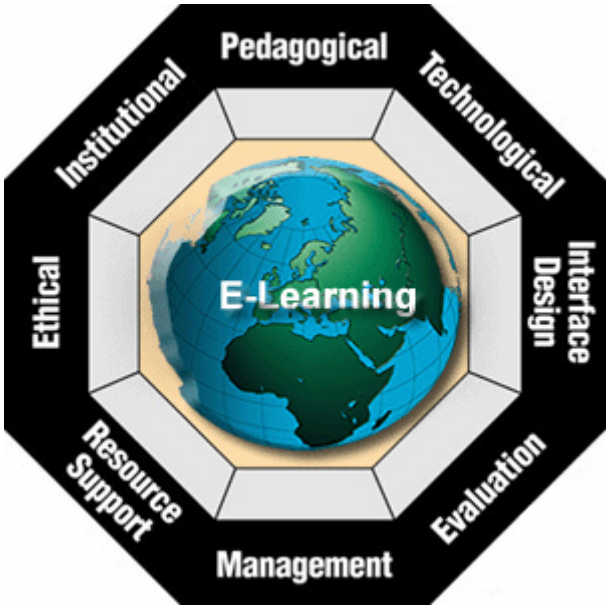

Figure 8. Khan's framework for e-learning.

A project planned along similar lines is currently being performed by Badrul H. Khan. After the publication of *Web-Based Instruction* (Khan, 1997) the author communicated with learners, instructors, administrators, and technical and other support services staff involved in e-learning (in both academic and corporate settings) all over the world. Also, as the editor of *Web-Based Training* (2001), he had the opportunity to work closely with more than 100 authors worldwide who had contributed chapters to these two books. Through these activities, he came to realize that e-learning represents a paradigm shift not only for learners, but also for instructors, administrators, technical and other support services staff, and indeed the institution as a whole.

This amassed experience led **Khan to formulate an extensive list of caveats that are organized around eight key dimensions that form a course designer's "framework for e-learning"** (see Figure 8). These critical dimensions are: pedagogical, institutional, technological, interface design, evaluation, management, resource support, and ethical considerations. Each dimension has several sub-dimensions, and each sub-dimension consists of issues related to a specific aspect of an e-learning environment. These issues generate many questions that course designers can ask themselves when planning or designing an e-learning system.

More detail on the framework and how to use it may be found in Morrison and Khan (2003) and soon in two new books that are to be published in Turkey and in China. *E-Learning Strategies* (in press) is a detailed description of the framework and all the planning issues it raises. *E-Learning QUICK Checklist* (in press) presents questions that one can use to design and evaluate e-learning materials and distance education programs. This work is an attempt to integrate in a systematic way the practical experience of those who have "tried and sometimes failed" so as to serve as a set of guidelines for those who follow on. I say that this is more an integration of praxis than of research evidence, for there is much practice but little hard research on E-learning so far. However, the available research is also being integrated, and the process of integrating the experience of the pioneers is in itself a qualitative research study of sorts. Furthermore, the guidelines themselves may act as a stimulus for other researchers to identify key questions that require further investigation and perform the studies that are currently so few.

Hard research on the general issues involved is, however, available in the general field of education and training, if not specifically on E-Learning projects. And, for reasons that should become obvious by the end of the article, such research is also largely applicable to the E-learning case. One particularly important study, which we shall use to round off this article, is that performed by Joseph Kessels (Kessels, 1993; and see Kessels & Plomp, 1997, for a summary). This was a long-term longitudinal study of the effectiveness of the Systems Approach as a basis for the planning and implementation of corporate training and development programs and projects. The study followed up the results of more or less systematic/ systemic approaches to ID/HRD in multiple organizations, for all levels and categories of employees, for a full range of content categories, and for both conventional and technology-based modes of delivery.

Kessels found that the employment of a systematic design approach/model generally led to more effective and consistent courses and programs—he referred to this aspect as "internal" consistency. But he found that an equally or even more important factor for project success was the adoption and effective/efficient implementation of what he refers to as the "Relational Approach." This is: the adoption and implementation of methods that ensure that all who are involved in execution of the project are appropriately oriented, trained, motivated, and managed to ensure full cooperation at all times; that all who are impacted by the project are appropriately involved, oriented, and "kept on board"; that all possible sources of friction, resistance, or competition between the new system and other pre-existing systems are identified, tracked, and appropriately managed; etc. Kessels refers to the achievement of all this as ensuring "external consistency." The research results showed that both these approaches, aiming towards both types of "project consistency," are important and add to the probability of long-term project success. But, most importantly, he demonstrated, with many examples drawn from multiple case studies, that a project that was relatively unimpressive from the viewpoint of systematic instructional design could nevertheless be successful and improve over the long term if the relational approach was effectively and efficiently practiced throughout all project phases. However, the best, most imaginative, and most systemically conceived instructional designs are doomed to

failure if the relational aspects are not appropriately handled.

Some years before this research was published, I was working in a large and long-existing management consulting organization. When I first joined the organization, I was exposed to several key maxims for successful project execution that the organization used in their internal staff training. One of these maxims was: "A successful project is just 20% technique and 80% tactics." In this context, the term "technique" is understood as all that you can learn from books or courses, and "tactics" are what you learn on the job, from the "university of life." As most maxims, this may well be an exaggeration of the reality, but it makes the point that, as is often the case in the human sciences, the hard research studies, such as the work by Kessels, come after and corroborate what the reflective practitioners have already identified from their praxis and transformed into a working paradigm, or at least a set of heuristic principles, or "maxims."

So, returning, once more to the Systems Approach model (see Appendix 1) and to the literature reviewed in the present article, we may conclude that the factors that most strongly impact the ultimate success or failure of an E-Learning project have less to do with the technologies used and technicalities of designing courses for these technologies, and much more to do with the broader and more general factors that impact the success or failure of any innovation in the context of human-activity systems—education and training systems are prime examples, but the principles are far more generally applicable. And these principles are unfortunately less formally studied—even less capable of being studied—than the mainstream ID&D models of our field. However, there is some progress. As regards the first major phase of the project lifecycle depicted in the Appendix, much knowledge has been contributed by the research and praxis that we now refer to as performance improvement technology/engineering—particularly that aspect referred to as "front-end analysis." As regards the study and mastery of the Relational Approach and its application across all project phases, but most importantly in the third (full-scale implementation and management) phase, we are still somewhat behind where we should be. It would be natural to look at the management sciences in general, and especially the knowledge base on project management. This we tend to do, at least in some formal programs, such as the Instructional Design, Development, and Evaluation (IDD&E) program at Syracuse University. However, if the sages at the management consulting organization are correct, then much of the really important learning in this area is not classroom or theory-based, but is achieved on-the-job, by working in real project contexts and dealing with real people.

Maybe more attention to the (computer-based?) simulation of typical real-life situations might help. Maybe the cognitive apprenticeship model is the answer. But the key question is whether the proponents and practitioners of E-learning projects will themselves learn (and in time) what they need to learn as regards the Relational Approach and its effective application. Or will the "E-learning Baby" get to be "thrown out with the bathwater," as was the case of so many promising innovations in the recent history of education and training? Time will tell. But the indications are that we shall find out sooner rather than later! ▭

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Appendix

A Summary of Key Project Success/Failure Factors

This table is based information maps on "Why Projects Fail," first presented as Chapter 20 in the book *Designing Instructional Systems* (Romiszowski, 1981).

Please note that in the summary presented here, the second main project phase—instructional design and development (ID&D)—has not been expanded in as much detail as the first and third phases. This is in part because the factors involved in successful ID&D are well known to most readers of this magazine, so repeating them would be "information overkill." Also, the specific details that could be listed for the ID&D phase would be somewhat different, depending on the specific ID models and learning theories/ philosophies espoused and, in some sub-stages, are also dependent on the media selected in earlier stages. We wished to avoid "noise" in our communication by diverting attention to these details and away from the main purpose of the presentation, which is to emphasize that project failure is more often associated with poor execution of some aspects of the first or third phase—and that this can undermine all the valiant effort expended on the ID&D phase, however well that is executed.

Initial (Project) Design

- Identification and definition of the problem/need.
  - Is there a real problem/need that is worth addressing?
  - If a "problem," what are the symptoms, causes, and effects?
  - If a "need," who and where are the "needy"?
  - What are the probable costs and benefits of a "solution"?
  - Assignment of a priority and a budget-range to the project.

- Analysis of the problem/need in order to identify:
  - alternative viable solutions;
  - existing resources and constraints;
  - possible conflict among sub-systems;
  - other sources of risk or difficulty; and
  - the "optimal"solution(s).

- Overall (strategic) design decisions on factors, such as:
  - sequence and structure of the course;
  - methods and media to be employed;
  - learning group size, structure, organization;
  - course management and evaluation systems;
  - detailed design of the pilot project phase; and
  - a full-scale implementation/diffusion plan.

Instructional Design and Development

- Detailed design of the instructional system components (see any ID model for a suggested list of components).
- Development of the instructional system components (scripting, authoring, graphic design, production, validation, etc.).
- Controlled implementation under pilot-test conditions (simulation of real conditions, testing for planned/ unplanned effects, etc.).
- Evaluation and revision (possible re-iteration through earlier project phases).

Dissemination/Implementation

- Production, reproduction, and distribution.
  Efficient lines of communication (for "marketing" and later "support").
  Adjustments and contingency plans for possible "scale effects."
  Efficient project resources (time, money, people) management and control.
- Implementation and use.
  Care in preparation of the environment for the innovation.
  Track and control possible sources of conflict or resistance.
  Prepare all human resources—orient, inform, train, motivate.
- Long-term management and evaluation.
  Mange the institutional (contextual) philosophy and culture factors.
  Create a structure appropriate for effective management by objectives.
  Manage the human relations factors that generally emerge over time.

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Much of the success in new product launches lies in the planning that occurs months in advance. This includes the use of market research to understand consumer needs and the preparation ...Â This contributes to the development of a marketable product or service solution that has a high potential for success. Customer surveys, test product sample marketing and polling are techniques used to identify what customers want. This knowledge is useful in designing products that provide clear advantages to customers relative to competitors. Product Benefits. Just knowing what customers want doesn't guarantee success. A gap in the ability of the marketing function to control outcomes exists in product development.