

Learning without frontiers: Building integrated responses to diverse learning needs¹

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Abstract

This paper looks at instructional design issues in what might be considered unusually complex settings. Such settings, however, become relevant when attention is focused on the learning environment at large, rather than the search for specific responses to relatively neatly defined learning needs of limited scope within that environment. The development of sustainable livelihoods in an international development context generally requires approaches that take such complexity into account. Such approaches are equally necessary whenever serious attempts are made to reconceptualize the learning environment in a large-scale fashion. The first part of this paper presents a conceptual framework to situate the problem under discussion. Subsequently, five cases are briefly presented, four of which from developing countries. These cases are analyzed against the backdrop of the conceptual framework. Finally, conclusions are drawn and principles derived the concurrent application of which is argued to be necessary in order to create an open and responsive learning environment.

The need for multiple perspectives on learning

Learning is a complex phenomenon. However, its complexity is not always recognized in an instructional design context that favors isolated learning tasks. Some learning tasks can indeed be performed best in well-defined settings in accordance with designed procedures that assume a more or

¹ This paper is inspired by the work of the Learning Without Frontiers coordination unit (LWF) in UNESCO, the United Nations Educational, Scientific and Cultural Organization. Both authors collaborated over a two-year period from mid-1996 to mid-1998 in the context of this unit. Information about LWF is available at <http://www.unesco.org/education/lwf>. Any opinions expressed in this paper are entirely those of the authors. They do not necessarily reflect any position taken by UNESCO as an organization. The authors can be contacted through the following e-mail addresses: Jan Visser – j.visser@unesco.org; jvisse@ibm.net; David Berg – bergd@edte.utwente.nl; bergds@wxs.nl.

less linear process that leads learners to attain well-defined instructional goals in predictable ways. This is convenient, useful, and practical in many cases, and much of the instructional design practice is thus based on this assumption. However, no learning system designed in accordance with it can be seen as strictly closed. Learners and learning communities are usually part of multiple, often overlapping, learning contexts that interact with each other. It is thus possible – in fact, it is reasonable to assume – that the meaning of learning as perceived by learners is different from how it is seen by the designers of separate pieces of instruction. This paper will explore these discrepancies of views on learning by looking at learning from an overall perspective as a starting point, rather than by focusing primarily on partial learning tasks that are performed in isolation. Consequently, it will discuss design concerns at a higher level of integration than is normally the case in the instructional design practice.

Learning, then, as referred to above, is seen as an innate part of the human existence, covering the entire lifespan. Human beings, and the social entities in which they organize themselves (communities, organizations, corporations, schools, etc.), engage in learning in the interest of survival, continuous interaction with change, and growth, i.e. sustainable development. Our concerns regarding learning, as reflected, for instance, in the work of researchers, theorists, instructional designers, and policymakers, usually relate to specific portions of the learning landscape. Some such restricted areas of concern are the school context, the family environment, the workplace as a space of learning, specific training settings, or even entire areas like organizational learning. The point made in this paper is that, in addition to such partial perspectives, it is important, also, to care for the learning landscape as a whole. The question addressed thus is: Through what conditions in the learning environment as a whole can we optimally serve the interest of the development of learning at different levels of organizational complexity? In other words: What is really involved in creating a learning society?

Relevance of the problem

Looking at learning in different ways than we used to do is relevant for a variety of reasons. They have to do with (1) the ways in which the world, and the position of people in the world, have changed; (2) our enhanced understanding of the nature and importance of learning; (3) the greatly increased range of channels available to facilitate learning. Each of these three reasons will be further explored in the following sections.

Learning in a changing world

Increased complexity and a continually growing pace at which change takes place characterize the modern world. The reason is simple. More people populate a tiny planet, their intensity and frequency of interaction continues to grow, they intervene more dramatically in the physical and biological environment, and they organize themselves in ever more complex and dynamic local and global networks. One can best appreciate the magnitude and importance of such change in a long-term historical perspective. Figure 1 provides one such a long-term view. Sakaiya (1991) refers to population factors, in addition to technological change and changes in resource supplies as “disrupters of civilization” (p. 128).

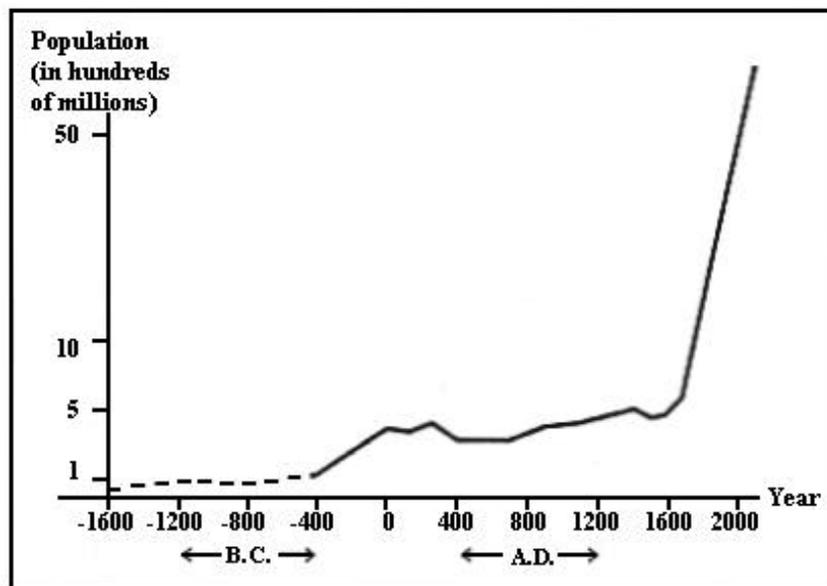


Figure 1: Global population patterns from 1600 B.C. to the present

From: Sakaiya, T. (1991).² (Original source quoted by Sakaiya: Jean-Noel Biraben.)

Correcting for accidental ups and downs in demographic growth, one is basically looking in Figure 1 at a phenomenon of exponential growth. Already thirty years ago, Arthur Koestler (1989; original publication date 1967) wrote: “The uncanny properties of exponential curves reflect the uniqueness of our time – not only the population explosion, but also the explosion in power, communications, and specialized knowledge” (p. 317). Developments since, such as they relate, for instance, to the increase in computing power and the spread of Internet technology, sustain this assertion.

² Reproduced from Sakaiya, T. (1991). *The knowledge-value revolution, or, a history of the future* (p.111). Tokyo, Japan: Kodansha International Ltd., originally published in 1985 in Japanese by PHP Kenkyujo, Kyoto, Japan as *Chika kakumei*.

The problem is not so much the *magnitude* of change, according to Koestler, but the *rate* of change, which the imagination has much greater difficulty to accept. “The mind boggles at an exponential curve as Pascal’s mind boggled when, in the Copernican universe, infinity opened its gaping jaws: *‘Le silence éternel de ces espaces infinis m’effraie’*” (p. 319).

Increased complexity and exponential change have given a different meaning to the importance of lifelong learning. Several decades ago it was still possible to visualize one’s learning throughout life as consisting of essentially a preparatory phase, followed by maintenance learning, whenever required, through the remainder of adult life. People had the feeling that they could basically prepare themselves for the rest of their lives during childhood, adolescence and early adulthood.⁴ What they then learned was seen as closely related to their career prospects in the world of work. This is no longer so. People advance more successfully through life by not staying in the same job, switching careers, and by turning themselves into what Handy (1995) calls “portfolio people” (p. 26), giving themselves more freedom while accepting – and managing – greater levels of uncertainty. In addition, people learn for other purposes than their integration in the world of work alone.

Living with exponential change is not restricted to the industrialized world. It is equally a reality in the so-called developing world. Due to the greater interconnectedness of the world, developing regions feel the impact of such change, even if they are not themselves the main originators of it. In addition, those regions face the challenge of limited resources and reduced access to and participation in the governance of global infrastructure, such as for telecommunications and informatics.

Nature and importance of learning

Lifelong learning, then, is of crucial importance in today’s world. It is essential for people’s ability to cope with and participate constructively in the change processes around them. Like in the past they require to learn in order to develop their abilities to participate in the world of work, but among those abilities now ranks very high the ability to learn – and to manage one’s learning – autonomously throughout life, skills in the metacognitive domain being a serious counterpart to the skills on ‘lower’ cognitive levels. In addition to the requirements of the world of work, civil society at large requires empowered citizens, able to participate in dynamic democratic structures. Care for the human, biological and physical environment is of the essence, requiring an appreciation of the complexity of our position in the world which only learning can provide. Against this background it is important to interpret the

³ ‘The eternal silence of those infinite spaces frightens me.’

⁴ An interesting analysis of the problem referred to here can also be found in Botkin, J., Elmandjra M., and Malitza, M. (1979).

concept of lifelong learning not merely in terms of having access to structured learning opportunities beyond schooling. More fundamentally, we define lifelong learning here as the set of attitudes and skills, available within a facilitating environment, that lead people and social entities to identify themselves as learners on a continuous basis.

The context and infrastructure that support human learning, though, as developed during the industrial age and inherited by most of the existing educational practice, are dominated by the school conception. Architecturally they are expressed in the form of closed spaces of learning, organizationally they reflect hierarchical structures and assembly line procedures, and they see knowledge as a commodity to be acquired or passed on from one person to the other. Sfard (1998) refers in this regard to the ubiquity of the “acquisition metaphor” in which such practice is embedded, as contrasted with the “participation metaphor” (p. 5). The model is so pervasive that even alternative modalities, such as much of the distance education practice, are built on the same assumptions as those that underlie conventional school-based learning. Such modalities, however, are poorly suited for the learning society of today, which capitalizes on the processes of knowledge production, rather than on its products. Gibbons (1998) refers in the latter context to the value-added inherent in the “creativity to configure knowledge and resources over and over again” (p. 27). Johnson-Eilola (1998), more specifically with reference to the practice of writing in an Internet-based environment, emphasizes its “associational rather than accumulative” (p. 19) nature and therefore the creativity of connection.

Keywords for any true learning situation are *interaction* and *collaboration*. Those who participate in the learning process must be able to connect with each other. *Networking* and *connectivity* are thus additional keywords. Moreover, learning that is worth its while will be *problem-based* and *task-oriented*. As most real-life problems transcend the level of analysis represented by isolated disciplines, *transdisciplinarity* will be another feature to be emphasized. Finally, it is in human nature to problematize the world continually, whence learning never stops. Learning is therefore an *open* process, requiring that the environment that facilitates and nurtures it be *flexible* and *adaptive* to the learning individuals and communities.

Multichannel learning contexts

A third reason to change our perspective of learning has to do with the need to move beyond the conception of the learning process as something activated and maintained by basically a single channel, a single path to learning. Such a conception usually derives from lack of concern with the learning environment as a whole and is closely related to the issue of quality of learning. Its importance is

highlighted particularly in connection with the situation in developing countries where, as Anzalone (1995) puts it, “one usually finds few paths to learning [and] time is spent locked into the routines of copying text..., listening to teachers’ verbal renditions of information, and reciting and memorizing text from the blackboard or textbooks” (p. 9). The concern calls for the reconceptualization of the learning environment to serve the learning needs of society at large. The World Declaration on Education for All (Secretariat of the International Consultative Forum on Education for All, 1990) thus calls for “an ‘expanded vision’ that surpasses present resource levels, curricula, and conventional delivery systems while building on the best of current practices” (p. 4). Such an *expanded vision* is made possible by the emerging possibilities that “result from the convergence of the increase in information and the unprecedented capacity to communicate” (p. 4). Anzalone recommends a process that “begins by looking at learners and their connections with bodies of knowledge, information and skills, and a commitment to build upon what currently exists,” and that “then looks at how in a value-added fashion learning could be strengthened by using more and varied learning channels to open up and animate the learning process” (p. 9).

The whole learning environment:

A vision of nested frameworks with different levels of organizational complexity

The concept of learning environment, as used in this paper, is distinct from, though also related to, the more restricted use of this term, which focuses on the immediate environment of the learning individual or social entity as seen from the perspective of attaining a specific learning goal. Taking such a perspective, Wilson (1995), for instance, proposes the following definition for a constructivist learning environment: “A place where learners may work together and support each other as they use a variety of tools and information resources in their pursuit of learning goals and problem-solving activities (p. 27). The classroom, if conceived in ways different from traditional educational practice, can thus be seen as a specific learning environment. Similarly, a company can set itself up as a learning organization and accordingly structure its environment to become a learning environment. Similarly, the family environment, a museum, a computer clubhouse, the media constitute other such environments for learning. We argue here that it is important to elevate the concept of learning environment to go beyond that of the examples just given. The idea of learning environment we propose comprises different levels of organizational complexity, ranging from low to high.⁵ It includes, but is not limited to, the notion of

⁵ These ideas have previously been developed by the first author in keynote addresses at, respectively, the Second Global Conference on Lifelong Learning, held in Ottawa, Canada, March 23-26, 1996 (Visser, 1996) and the European Conference on Learning Cities, held in Southampton, UK, June 20-23, 1998 (Visser, 1998).

learning environment covered by Wilson's definition. To make clear what we have in mind, we draw an analogy with concepts from the world of environmental science.

The biosphere, according to the Encyclopaedia Britannica (1999) is the "extremely thin, life-supporting layer between the upper troposphere and the superficial layers of porous rocks and sediments" that cover the Earth. One usage of the term is in reference to the part of the world in which life can exist. Another usage of the term is to indicate the collection of living beings together with their environment. In both meanings the term refers to the full range of conditions and organisms existing on the planet Earth. Inherent in the second usage of the term is the notion that organisms co-exist and that the life of one organism is conditioned by the life of all other organisms present in the environment. In fact, the different organisms both live in the environment and are, at the same time, an important constituent part of it. Species interact with each other to form biological communities. In the process of competition for shared resources, species adapt to the physical parameters and the flora and fauna within the community, carving out their specific niche through the development of specialized features. This gives rise to the development of structures within communities such as food chains, food webs, guilds, and other interactive webs. Relationships within these structures change over time as the different species co-evolve. At any point in time there is a tremendous diversity of life forms that co-exist thanks to the presence of nested frameworks of organizational complexity to which different time scales and spatial frameworks apply.

Our vision of the learning environment is grounded in the same notion of nested frameworks with different levels of organizational complexity, each with specific spatial and temporal frames of reference. The classroom represents one such level of organizational complexity as it applies to a specific learning community and specific learning goals. In spatial terms it is conditioned by the typical architectural parameters that allow us to identify the school building almost immediately in any community, however different from our own. In temporal terms it is premised on the notion that learning takes place in quanta of 50 minutes (see also Wilson, 1995). Similarly, the members of a family, to the extent that they function as a learning community, present a different level of organizational complexity with totally different time frames and spatial connotations. Likewise, the learning environment created within the context of a learning organization represents yet another frame of complexity. Some members of the learning family in our example may simultaneously be part of the classroom-based learning environment and others of the learning organization. Hence, things start to interact. In addition, all three environments could be part of a

more comprehensive learning environment, such as that of a learning city.⁶ At a yet more comprehensive level, it is equally feasible to think of the learning environment at the level of an entire province or even a country or region.⁷

The notion of nested frameworks, then, is an essential element of the vision of the learning environment presented in this paper. It is particularly important in connection with the optimization of learning – in its generic sense as discussed in this paper – in relation to the mobilization and organization of resources in the learning environment. Different learning communities with varied learning purposes compete for the same resources. Such resources are always scarce, particularly so in developing countries. The co-existence and co-evolution of different learning communities will thus best be served if the various communities of interest see not only themselves, but also each other and the environment as a whole. Such an attitude is greatly facilitated if concrete instances are allowed to develop in which different learning communities interact with each other. To create the conditions for such interaction, and thereby letting the learning environment acquire greater levels of integration while developing out of current infrastructure and educational practice, is a considerable challenge. It has profound implications in the area of management of change at macro, meso and micro levels that will not be dealt with in this paper. It also has profound design implications, particularly at levels that go beyond the conventional concerns of instructional designers. In the second part of this paper we shall discuss a number of these design implications. In part they are prompted by technological development. However, as Mendelsohn (1998) points out, technological development should rather be seen as a mere opportunity to start rethinking the learning environment. The real reason is that we have started to think differently about what it means to be learning.

Designing with the integrated context in mind

Whenever learning takes place, at least two things happen. To start with, it results in the acquisition of the particular skills, pieces of knowledge, and attitudes, the lack of which prompted the learning effort in the first place. However, at the same time, any learning activity also contributes to developing the capacity to learn in the learner and to establishing and/or developing the explicit or implicit learning communities, of which the learner is part, that are motivated by the interest underlying the learning activity in question. In addition, it often results in the creation of conditions, such as

⁶ Readers unfamiliar with the learning city concept are referred to a forthcoming book by Longworth (in print), the web site of the European Conference on Learning Cities, held from 20 to 23 June 1998 in Southampton, UK, <http://www.southampton.gov.uk/Educate/learn.htm>, and to the study *City strategies for lifelong learning of the OECD Centre for Educational Research and Innovation* (1993).

⁷ An example is UNESCO's work in Mozambique (Klees, S., Matangala, A., Spronk, B. and Visser, J., 1997).

infrastructure, instructional development capacity, and a motivational context, that may be important for the development of future learning. Against the backdrop of our argument that learning is an innate human behavior, pervading all aspects of life and covering the entire lifespan, it is important not to lose sight of the latter consequences while directing a design effort at the former. In the context of our environmental metaphor one could also say that it is environmentally sound to care for the learning environment while engaging in any partial learning activity within that environment. From the designer's point of view this translates into a dual motivation that should underlie the designer's work, namely that the learner attain the specific learning objectives for which the designer was hired and, in addition, that the learning environment be developed in ways that promote and facilitate future learning. In this context the issue of optimization begs reconsideration. What would be best from the perspective of attaining the specific learning objectives may not necessarily contribute in equally effective and efficient ways to developing the learning environment at large. Trade-offs may thus have to be negotiated.

It is important to note that this is not a call for sloppiness of design. Quite to the contrary. Much of what is referred to here in terms of 'care for the learning environment' can easily be translated into objectives that relate to a more comprehensive level of consideration of the learner's needs. Such objectives have to do with the sort of technical skills that can, for instance, be found in the how-to-study guides for the less experienced learner. They have equally to do with the more reflective capabilities that allow people to contemplate, be aware of and manage better their own learning behavior. But they also have to do with the development of an aesthetic sense that makes people consider learning to be just the right thing to do. Furthermore, it is related to the empowerment of people and communities to intervene in the learning environment so as to ensure that optimum conditions exist to facilitate and promote learning.

The question of empowerment is crucial. It attributes responsibility to the learners for the learning environment that they are part of. Environmentally sound design for learning, therefore, requires approaches that differ from the traditional ones in that they look at the design effort as one that is not exclusively undertaken by the designer or the design team, but as one in which different actors play a role and that is therefore fundamentally a distributed and participatory process. In such a setting the instructional designer plays the role of expert participant designer.

In the remaining part of this paper we will analyze cases from Zimbabwe, Mozambique, Bangladesh, The Netherlands, and Central America.⁸ These cases, three of which originated in the UNESCO context, seem to us to provide interesting examples of how efforts to attend to a specific set of

⁸ Details about three of these cases (Zimbabwe, Mozambique and Bangladesh) are available online via the *Learning Without Frontiers* (no date) web site.

learning needs contribute more comprehensively to building the learning environment at large and creating the conditions for ongoing learning. In other words, these cases exemplify the generative nature of learning, learning leading to further learning.

Cases

Due to space limitations we offer but incomplete descriptions of the cases below. We have done our best, however, to capture as much as possible the nature of the several activities and projects to the extent that would best serve the purpose of the analysis presented later on.

Zimbabwe: Learning Network for African Teachers

Each of five teacher training colleges in five geographically dispersed cities in Zimbabwe were provided, early 1997, with one Pentium computer, one year connectivity to the Internet, and some initial training for teacher trainers in the use of these facilities for learning purposes. The project was conceived as a pilot activity in the context of a larger scheme that is intended to eventually benefit some twenty African countries. Supportive national policies, the presence of a microwave backbone, the possibility for local dial-in on all locations, as well as the technical support provided by the national telecommunications company were facilitating factors for the implementation of the pilot in Zimbabwe. Although faced with a multitude of technical problems, most of the 10 participating teacher trainers – two from each of the colleges – have been active in establishing a network through which learning-oriented communication at different levels and related to varied learning interests takes place. Since the inception of the project several workshops have taken place at the national level, while at the school level the educators have developed a wide variety of activities. As a result, teachers and students have acquired competencies in the use of information and communication technologies and resources available on the Internet are being used for classroom purposes. The new opportunities have lowered barriers between the colleges and their communities. High schools are intensifying their relations with the teacher training colleges, and in at least one of the colleges the Internet facilities have been opened for use by distance education students from the surrounding community and in one or two cases opportunities for learning and professional development abroad is becoming a viable option.

Notable feature:

- Technology as trigger for pedagogical change.

Attending to the learning environment as a whole in Mozambique

Civil strife in Mozambique during a 15-year period following the country's attaining independence from Portugal in 1975 led to the destruction of most of its educational infrastructure and killed, or otherwise put out of function, large numbers of educational personnel. This vast country is now faced with a tremendous challenge to create learning opportunities for a population that is weary of war and eager to establish the conditions of sustainable peace and development. Everywhere in the country small initiatives, often community based, sometimes supported by international and local non-governmental organizations (NGOs), are developing. Such initiatives focus mostly not on reconstructing schools and training teachers, but rather on developing opportunities to learn the skills and expertise that are immediately relevant to reconstruct the country as it struggles with the heritage of civil war. Many of these initiatives function in isolation of one another.

Upon the request and with the support of the educational authorities of Mozambique as well as with the involvement of a large variety of local stakeholders, UNESCO's *Learning Without Frontiers* coordination unit has initiated a process to explore integration and further development of these community-driven initiatives. The initial focus is on one of the provinces, Nampula, but the process aims at eventually attaining nation-wide coverage. Rather than conceiving of this effort as one to create a non-formal education structure parallel to that of the formal system, the overall focus is on integration across the learning environment as a whole, making such distinctions as between formal, non-formal and informal learning largely irrelevant. The process does not have a predefined timeframe. It is foreseen to be long-term and may require a commitment on the part of the external parties involved for as long as 10 to 20 years. It is designed to be driven by local forces that work in collaboration with external partners.

Notable features:

- Variety of levels of organizational complexity.
- Involvement of different state sectors, non-governmental organizations and entities representing civil society at large.
- Community-driven and locally based.
- Non-linear development, focusing on facilitation of process within a complex environment.
- Community at top of organizational chart.
- Growth model.

Visual storytelling in Bangladesh

The previous two cases focused on learning at the level of teacher training colleges and that of a large-scale context at the provincial and national levels. The current case provides an example of how, on a very small scale, children learn and make sense of their otherwise apparently senseless, poor, and often violent environment.

Helped along by a photojournalist from Dhaka, the capital of Bangladesh, this project was motivated by the desire of children to inform the world in an unbiased way about how they saw their day-to-day reality. Thus, a group of children from the streets of Dhaka was provided with basic photographic materials and instructions about how to build and use their own pinhole cameras. Collaboratively they built a darkroom. They started to visualize the environment they live in, highlighting the issues they experienced as most relevant.

While on the one hand producing the photographic images provides a source of income, a valuable contribution to sustaining life in the slums of Dhaka, learning to use photography to express relevant experiences leads for the participating children to a level of reflection and interaction with their environment that provides for greater insight and understanding of their situation.

Notable features:

- Problem-based learning approach.
- Children learn by reflecting on their socio-economic situation.
- Children participate in constructing their own learning experience and tools for learning.
- Empowerment-oriented approach.

The Netherlands: Study-home, a new approach to schooling

The Netherlands has chosen to do away with traditional instruction in the last three years of high school (age 15-18). Instead, schools are remodeling themselves, also in terms of infrastructure and organization, into study-homes where all required facilities are present for the students to work on their projects and learning tasks, individually or in small groups. While the national educational inspectorate keeps its responsibility and final examinations still stand, the recent innovation in school policy explicitly promotes the learning experience during the latter years in school to take into account constructivist ideas. The policy is implemented with a fair amount of freedom for schools and individual teachers to experiment. The result is a proliferation of schools that have been experimenting with new formats and procedures for a couple of years alongside other schools that have adopted a wait-and-see attitude. In a

few years' time, all secondary schools are expected to have made clear choices as to the way they want to put the Study Home concept into action.

Notable features:

- Variety of levels of organizational complexity.
- Sanctioned and promoted in context of national policy.
- Involvement of Ministry of Education.
- Schools/classroom-based change process.
- Involvement of teachers, students, parents, and the community at large.
- Students become more responsible for their own learning
- Stimulation of more school-community interaction at all levels.

Skills development in Central America

Countries in Central America are faced with the problem of a growing group of young adults who leave school while being functionally illiterate and not having the skills that allow them to start contributing to the development of their communities in meaningful ways. An effort was initiated, with the support of UNESCO, to develop audiovisual packages for the acquisition by this target audience of basic skills so as to prevent this group from becoming a serious source of frustration and social unrest. A team of well-trained and experienced local audiovisual designers and producers from six countries in the region has developed a series of packages, focusing on areas such as pottery, the production of mud bricks, furniture construction using local materials, building of houses, and agricultural techniques.

Notable features:

- Traditional instructional design context.
- Clearly defined skills.
- Clearly defined audience (illiterate adults).
- Collaborative development effort of six countries.
- Flexible use in context of community learning resource centers.

Analysis of the cases

In this section, the five cases presented above will be analyzed, highlighting relevant characteristics and choices that bring out the conditions that are propitious towards the evolution of an integrated learning environment. Most importantly, we would like to demonstrate how apparently

contradicting approaches, sometimes applied in one and the same project, work best towards creating learning environments that foster openness.

"The idea that courses can be designed in advance so as to work *equally* effectively with successive cohorts of learners, is undermined..." (Thorpe, 1995, p. 175). Thorpe makes this statement, referring to the importance of the social context learners are part of, their role, their relationships, the way they interact, and the impact of the reality as perceived by learners in the way they solve problems. She continues to argue that much of the design of any learning event should take place, in fact, during the implementation phase, so as to be responsive to the varying needs and requirements of learners. In the Dutch 'Study Home' case this recommendation is taken into account to a degree. The delivery aspect in this approach has been given low priority, emphasis being on facilitation of the learning process rather than its being executed according to pre-designed static procedures. Learning 'careers' are being defined in constant dialogue with the students. The role of the school is to provide for the appropriate facilities required to meet the needs of each individual learner's study plan in a way that leaves room for adaptation as the learning experience unfolds. Also relevant in this context is the Bangladesh case, probably mostly because the initiator was not 'hindered' by any heritage of the traditional instructional design approach. By being dynamically responsive to developing needs and circumstances, he managed to devise a problem based learning environment in which the children – typically not perceived as a 'target' audience, but rather as members of a learning community – acquire basic technical skills while at the same time they learn by reflecting on their socio-economic situation. They do so in constant interaction with each other and their environment at large, a condition which, according to Bereiter (in progress), is key to attaining deep understanding in that it "[cultivates] the learner's relationship to objects of knowledge, developing it into a relationship capable of supporting intelligent action." Moreover, the children become participants in constructing their own learning experience, including being the manufacturers of their own tools for learning. This case comes close to how we envisage the development of an integrated learning environment.

But what to do in situations like the one we described for the countries of Central America, where people in urban and rural areas are unable to contribute to their community in meaningful ways because they lack the essential and very basic skills to do so? What, if in addition, those same audiences lack the literacy skills customarily assumed to be a necessary prerequisite for any serious learning effort? And what, if furthermore, there is little motivation that would help relatively unstructured learning environments to become functional? Here one sees a large diversity of specific learning tasks that can indeed be responded to effectively much in the way in which the traditional instructional design approach

has proven its great value. There are clearly defined needs, well known circumstances in which targeted population groups will carry out their learning tasks within timeframes that can be predicted with a fair degree of certainty. Thanks to the designed intervention, audiences in Central America now get exposed to packages that cater for both their instructional and motivational needs, through which they learn to produce bricks for their homes, make pottery for commercialization, improve their agricultural techniques. There is little doubt in the mind of these authors that in such circumstances a nicely conceived linear approach best fits the identified needs.

We see no contradiction – but rather complementarity – between the conclusion of the previous paragraph and our overall argument that the linear approach is generally at loggerheads with how the learning environment as a whole should be allowed to evolve. Here we have clearly to do with differences in levels of organizational complexity. What works at one level may be totally inadequate at another level. While different from the viewpoint of organizational complexity inherent in these experiences, both the Netherlands ‘Study Home’ and the Central American ‘Basic Skills Packages’ approaches are similar in that they are conceived within a contextual perspective. In the case of the ‘Study Home’ the contextual dimension is reflected in, for instance, the students’ choice of their own individual learning careers and the selection of content areas on which to work for their different projects. In the case of the Central American ‘Basic Skills Packages’ project, the selection of content for the respective packages results from extensive field observations by local designer teams with the involvement of the client populations.

The Zimbabwe-based Learning Networks case, as well as the experience of the ongoing work in Mozambique, both involve learners as participant designers. Provided with the conditions to do so, the learners become more and more autonomous in defining their own learning needs as seen by them and they participate in developing the learning activities as the development process progresses. The project initiators in these cases assume progressively less intrusive roles, focusing on facilitating the development process, getting themselves as much as possible out of the way of the principal actors of the learning communities that are being generated. Rather minimal technological tools may play a greatly facilitating role in this regard, as shown by the experience of the Zimbabwe case.

In the case of Mozambique, where the formal learning infrastructure had been virtually wiped out, the project could start more or less from scratch as far as the reality on the ground is concerned. The case of Zimbabwe is different in that the project builds more specifically on existing structures and ongoing experience. In both cases, however, there is a need to bring together a large variety of stakeholders, typically more than just those that pertain to the responsibilities of a ministry of education, to explore opportunities to break through the spatial, temporal and other restraints imposed by either

existing systems or, where they do not yet exist, often strong preconceptions about how such systems should be constructed.

In the case of the Learning Networks project in Zimbabwe, the continuous formative evaluation of the whole project became very much a responsibility of the participating teacher trainers. Their motivation to advance in their knowledge and experience brought them to demand troubleshooting training so as to be able to tackle the recurrent technical problems. Also, the interaction among the teacher trainers, as facilitated by their connectivity, provided interesting opportunities for peer support and mutual review of experiences. Evaluation in this project thus became a natural process. In the Dutch 'Study Home' case, the evaluation of the experience is ultimately in the hands of the central government through mechanisms provided by the school inspectorate and centrally coordinated examinations. However, on the micro level, the process of participatively defining and monitoring learning careers gives students the opportunity to judge for themselves if they progress or not. Their teachers, who take on the role of learning process managers, guide them in doing so.

Conclusion

Educational technology traditionally focuses on "too-specific, product-based, uniform objectives; [places] too much emphasis on prior design and development of materials, followed by dissemination of standard messages to all learners indiscriminately; [emphasizes] behaviors mastered rather than ideas processed and correction of errors rather than reflection on the implications of viewpoints; and [is] shallow and superficial rather than encouraging the processing of complex, multifaceted content" (Hawkrige, 1996, p. 3). This short, yet clear statement reflects but some of the concerns we, as educational technologists, face while considering the challenge of working towards the evolution of the kind of overall learning environment envisioned in this paper. Many of the issues captured by the quoted statement are, or have been for some time, under discussion in our field. With the present paper we have not so much tried to capture these discussions, but rather attempted to bring to the foreground a number of options to reframe the debate. Based on our analysis of the cases presented, the following principles stand out. In our view, it requires the concurrent application of at least these principles to create the responsive and open learning environment envisioned in this paper:

- The instructional designer must take seriously the need to create the conditions that allow all relevant actors to participate, from the start, in the design and development process. This applies particularly to those actors the facilitation of whose learning is the primary goal of the system under construction.

- Given the full range of conditions, constraints and opportunities surrounding a project and its larger environment, the instructional designer must be tolerant towards accepting the concurrent validity of apparently contradicting methodologies and approaches within the context of a single project, recognizing the existence of a variety of levels of organizational complexity.
- It is important to recognize that no learning context is a closed one. The boundaries in which we sometimes try to capture them are there for purposes of conceptual convenience, allowing us to conceive simple analytical approaches to respond to learning needs. They become a most inconvenient barrier, though, as soon as we are willing to look at the development of learning and its facilitating environment in the broader perspective envisioned in this paper.
- Design concerns must reflect different levels of organizational complexity.
- The ISD field is characterized by the continual study and development of ISD models. Real life processes appear to be much more cyclic, iterative and chaotic than such models are capable of grasping. The instructional designer should thus be aware that the usefulness of ISD models for designing comprehensive learning environments should be seen as relative and limited in scope in a way that corresponds inversely with the level of complexity of the context in which they are being applied.

In this paper, we have tried to shed light on the ISD field in transition. We have done so from the perspective of our own experience in developing the conditions of learning in an international development context. We have found, over the years, that many of the assumptions underlying the traditional ISD practice appear less solid than the linear mind would wish to accept, hence causing feelings of insecurity and ambiguity. Such feelings of uncertainty have motivated us to undertake the introspective analysis presented above. We have argued that learning is a process not to be dealt with exclusively or entirely in terms of notions that attempt to break down its complexity. While such approaches may be very helpful in a number of instances, in many other cases they are inadequate to tackle the organizational, cultural and social complexity involved, as well as to account for the level of mental and neural intricacy. We have furthermore argued that the recognition of such inadequacy calls for a new perspective that the instructional designer should adopt. We must come to grips with and be constantly cognizant of the dimension of development, growth or process of knowledge – of science – in which uncertainty prevails, while moving towards attaining deeper understanding. The emerging notion of ‘knowledge society’, as e.g. reflected in the World Development Report (International Bank for Reconstruction and Development / World Bank, 1999) too often portrays knowledge as a commodity, worth money and therefore deserving our attention. However, learning, as we understand it, "is not the

accumulation of knowledge; instead, it is the letting go of concepts and ideas that stand in the way – mediate – our encounters with the world" (Hudak, 1998, p. 44, paraphrasing Thich Nhat Hanh). This does not imply rendering obsolete our conceptualizations. However, we need to allow that level of uncertainty, the ever-questioning attitude, to fundamentally grow in our understanding of the reality we live in.

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