

## DISTANCE EDUCATION FOR EUROPE\*

### PART I

#### THE CONCEPTUAL PANORAMA OF DISTANCE EDUCATION AND TRAINING\*\*

##### 1. PRINCIPLES OF DISTANCE EDUCATION

Although distance education methods have been used for a long time, it is considered that their first application to higher education has been initiated by the UNISA (University of South Africa) as early as 1946. However, it is also recognised that the foundation of the British Open University (1969) set the model for an integrated mix of pedagogic methods and multimedia technologies that are nowadays considered as an appropriate and credible system of distance education, operating at all levels of higher education and training. A number of important research works include comprehensive descriptions of the historical aspects of distance education, from its very beginnings till the present day<sup>1</sup>; a more succinct article by Ljosa<sup>2</sup> provides very actual information on the subject. It is now possible, with the benefit of many years of experience and conceptualisation, to look into the general European panorama of distance education and training with a more detached mind and with the pragmatic purpose of making it evolve towards a higher degree of integration and rationalisation.

We feel the need, nevertheless, to analyse briefly some of the more basic concepts and principles involved in distance education methods and systems.

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## 1.1 PEDAGOGY AND ANDRAGOGY

Traditionally the term "education" refers to the processes of influence and systematic acculturation, in an informal/familiar or an institutional/scholastic context, provided by older generations in favour of children and juveniles. A classical definition<sup>3</sup> of education, states:

"Education is the action exerted by adult generations upon those which are not yet mature enough for social life. Its objective is to motivate and develop in the child a number of physical, intellectual and moral conditions required by social life..."

However, the acceleration of the processes of social, technological and cultural changes impose frequent adaptations and innovations in regard to educational needs and the methods to cope with them. Another point of view by Alfred Whitehead<sup>4</sup> makes the diagnosis of the cultural/educational situation that was beginning to take shape:

"[...] he pointed out that it was appropriate to define education as a process of transmittal of what is known only when the time-span of major cultural change was greater than the life-span of individuals. Under this condition, what people learn in their use will remain valid and useful for the rest of their lives. But we are living in the first period in human history for which this assumption is false [...] today this time-span is considerably shorter than that of human life and accordingly our training must prepare individuals to face a novelty of conditions."

Thus education and training cease to be synonyms of transfer of knowledge to the younger generations and emerge as a constant renewal of needs along all the life of the subject. So, learning should not occur only in specific and fixed periods in the life of an individual, but during all his life cycle. We admit today that education begins with birth and ceases only with death; this leads to an increased recognition of the importance of kindergarten education, on one band, and of adult education on the other hand; the latter leads to concepts such as permanent education, continuing education, recurrent education and training.

This new reality determines a new image of the adult: adulthood is no longer considered as the last stage of a relatively short process of growing mature, to become a continuous development of skills, knowledge and experience lasting for whole life cycle. Research on adult education takes new directions, the subject's age being no longer the

only determinant datum; sources of social change, consideration of life events, analysis of the socio-historical development of the individual and, most of all, the subject's initiatives as prime agent of his own evolution, are considered extremely relevant. The concept of "self-directed learning", points to the dimension of self-regulation and self-determination in the process of adult education. This, however, does not mean that the decision to evolve and to acquire new qualifications is free of social and institutional constraints; rather, that these constraints act as boundary conditions in a dynamic process of psychological development centred on the individual, taken as main agent and decider.

Experience acquired in the field of adult education has shown that the pedagogic and didactic methods suitable for children and young persons do not turn out to be adequate for adults: the reason for this is that the **pedagogic model** is essentially heteronomic, given the fact that the educational relation-ship is established by an external control acting upon the subject, while the **andragogic model** is mostly autonomic and self-directed. Adults find in themselves the motivations and the needs for learning; and the learning process can neither be imposed by independent external sources, nor be unaware of skills and competences already acquired, and of the life conditions (family situation, profession, social environment, etc.) of the individual.

Taking all this into account, we are led to the notion of self-directed learning, as proposed by different authors. For instance, Malcolm Knowles<sup>5</sup> states that:

"An adult-learning experience should be a process of self-directed inquire, with the resources of the teacher, fellow students, and materials being available to the learners but not imposed on them."

This notion of the self-directed adult should be further analysed, for, in the more basic meaning of the term, it defines an autonomous adult, with aspirations to become educated and able to determine himself his options and his own process of education; but the concept might cover a wider scope of meaning, including the suggestion of the use of a non-directive pedagogy whereby the adult would have some control on the pacing, the curricula, the contents and the methodology of learning. From a more conservative point of view, self-directed learning, as a concept, should at least take into account the intrinsic motivation of the adult to intervene actively in the definition of the guide-lines of his own educational programme and to be able to make determinant choices about what kind of education he is willing to follow.

## 1.2 SELF-LEARNING, SELF-INSTRUCTION AND RELATED CONCEPTS

Designations like self-study, independent learning, open-learning, distance learning, distance education, etc. are often used interchangeably. This is not a desirable situation, given the fact that the associated concepts differ widely in semantic and technical contents and may lead to misunderstandings when formulating educational objectives and policies, which might be distinct or even contradictory.

Taking for instance the related designations **self-study** and **distance study**, they may be considered as adequate descriptors of the situation of students in a distance learning regime. In this precise context, the process of teaching-learning occurs with a physical separation between teachers and students, which means that the latter are supposed to carry on study activities in an autonomous and independent way, without the direct supervision of tutors, professors and other educational agents. In this sense, Holmberg<sup>6</sup> defines distance study as:

"[...] a form of education which is typically based on personal work by individual students more or less independently of the direct guidance of tutors."

From this point of view, the designation is essentially descriptive and quite neutral in respect to the underlying methodological philosophy. However, some authors use designations like **independent learning**, **independent study** and **autonomous learning**, implying an educational philosophy of student centred learning<sup>7</sup>. We may consider the designation **self-learning** as included in concepts like distance learning and distance study, given the fact that it is reasonable to postulate the existence of activities of self-learning nature in contexts of conventional education; but a more accurate definition of self-learning should emphasise the direct relationship between student, the learning materials and their contents, and the separation (or indirect relationship) between the student and the external educational agents.

In a distance education system the learning materials, the media, the curricula and the contents are designed and produced, in taking into account from the very beginning, the reality of this disjunction between learner and teacher, as well as the adult nature of the former; as a consequence, a distance education course should have the intrinsic characteristics of being self-instructional, meaning that<sup>8</sup>:

"(It should be) accessible for individual study without the support of a teacher. It can be self-contained or can be a guide to the studying of set, or alternatively suggested, texts."

Rowntree<sup>9</sup> points out one significant difference between self-instruction and a conventional one: for the former, the learning materials are specially designed and produced as major sources of learning for the group of individuals defined as the target population; while for the latter, learning is based on pre-existing materials that might, or not, be used by professors and students:

"Self-instruction [...] depends on materials specially written – or at least specially selected and modified – with particular course objectives in mind. Furthermore, they will be structured in such a way that learners can do most, if not all, of their learning from materials alone. The materials must carry out all the functions a teacher would carry out in the conventional situation – guiding, motivating, intriguing, expounding, explaining, provoking, reminding, asking the questions, discussing alternative answers, appraising each learner's progress, giving appropriate remedial or enrichment help ... and so on."

More complex is the relation between the concepts of **open learning** and **distance learning**. Open learning has essentially two different meanings: on one hand, referring to criteria of access to an educational system (**openness** taken as equivalent to the idea of removing barriers to free access to education and training); on the other hand, meaning that the learning process should be, from the point of view of the student, time-free, place-free and pace-free. Both meanings are linked to an educational philosophy that identifies openness with student centred learning. Along these lines<sup>10</sup>:

"Open learning arrangements enable people to learn at the time, place and-pace which satisfies their circumstances and requirements. The emphasis is on the opening up of opportunities by overcoming barriers that result from geographical isolation, personal or work commitments, or conventional course structures which have often prevented people from gaining access to the training they need."

There are two main reasons for the possible conceptual confusion between open learning and distance education. From its first experiences and achievements, distance education presented clearly an option of openness by reducing to virtual nihil the selection criteria and processes for gaining access to education; later, conceptual emphasis was given to aspects of a philosophy of student centred learning. Lewis<sup>11</sup> characterizes in the following way the evolution of the concept of open learning:

"In early definitions of open learning, access was stressed as the most important criteria. Open learning offered individuals the opportunity to benefit from learning

that would otherwise have been closed to them. [...] Open learning is now associated not so much with access, as widening learner choice over the content of the curriculum and the means by which it is delivered. In exercising responsible choices over these and other aspects of education and training, learners may gain increased autonomy and self-reliance - capacities highly prized generally in society."

### 1.3 THE SELF-DIRECTED LEARNING PRINCIPLE AND ITS APPLICATIONS IN DISTANCE EDUCATION AND TRAINING

A careful study of the rather rich bibliography dealing with the concepts and methods used in distance education and training will show there is a considerable amount of hesitations, divergences and controversies not yet solved. To illustrate the point we may look into the related questions of the use of face-to-face tuition and the methods for pacing the students' work, in use at different distance education institutions.

There is an obvious tension among distance educationalists about the degree of self-determination and autonomy that should be given to students or, conversely, on the type and nature of support and supervision, either proposed or imposed to them. Some authors sustain that students should have absolute autonomy in the definition of the beginning, the duration and the end of their education. Rumble<sup>12</sup> considers that any timetabled requirement, like having to meet deadlines for returning assignments or to submit to examinations, reduces student's liberty and so, the openness of the system:

"Open systems will allow a learner to decide when to complete assignments and be assessed."

Along the same lines Holmberg<sup>13</sup> states:

"My liberalism [...] makes me reject all kinds of pacing imposed on students, the sort of compulsion that, for instance (some institutions) submit their students to. The student should be in a position to begin and finish his course whenever he wants to."

The counterpoint to this "liberalism" is provided, however by many authors, among them Holmberg<sup>14</sup>, himself:

"In the interest of speed and efficiency, school-like learning with pacing and compulsory elements of teaching, is sometimes preferred by examination-oriented students."

Ross Paul<sup>15</sup> is even more sceptical:

"The notion of the self-actualized adult learner perpetuated in much of the literature on adult and continuing education is more myth than reality and distance education institutions bear considerable responsibility for helping its students inherent in this mode of education."

There is actually some evidence that students tend to drop out less if institutions impose some rules on pacing, which tends to confirm the above statements.

A more pragmatic approach is based on questions of logistics and organisation of distance education institutions, rather than on matters of pedagogical principle: it is awkward to offer an open-timetable of examinations, all along the duration of the year, in terms of providing physical spaces for examinations on many different subjects, as well as making available scores of qualified examiners, many times per year. In what respects student support, it became usual for these institutions to concentrate their efforts in establishing a network of study centres, wherein qualified tutors are available for guidance and pedagogical support, as well as providing opportunities for contact between students and the teaching staff, using communication technologies.

## 1.4 THE PROGRAMMED LEARNING PRINCIPLE

### 1.4.1 *Programmed Learning*

It has been said with some amount of humour that distance education is the legitimate child of a happy marriage between a programmed-learning methodology and a mass communication system; the role of the second party being rather obvious, it remains to be considered what the main characteristics are of that particular methodology.

Programmed Learning is based on the **behavioural psychology** of B. F. Skinner, that for many authors meant the passage from philosophical conceptions about learning to their scientific approach<sup>16</sup>. Programmed Learning was also inspired by the attempts to use in education some techniques already existing in industry: objective definition, task analysis, job evaluation and data processing<sup>17</sup>.

Skinner's behavioural psychology is based on stimulus/response associations and on the manipulation of reinforcement. We assume that the individual learns when, in a certain situation and facing a certain stimulus, he gives the suitable response. The reinforcement of that response increases its probability of occurrence while, if there is no reinforcement or a negative one occurs, the response may be extinguished. One accepts that the learning of complex forms of behaviour may occur by means of "arrangement" of several situations of stimulus/response association; and that learning will occur if the individual participates actively by performing pre-defined tasks and getting an immediate feedback about his task performance. Skinner also defended that each successive step of stimulus/response situations should be as "short" as possible, in order to minimize the possibility of error by the individual.

During the fifties Skinner devoted himself to develop principles to operate conditioning. He outlined the application of those principles and went further to a stage of implementation of real devices, which could be suitable for human learning<sup>8</sup>. Although the assumptions which Programmed Learning used to be based on, have had some changes along the years, its underlying principles are the following:

- Behavioural analysis: to decide about the final expected behaviour and identify the sequence of essential specific behaviours in order to obtain the final one. When we apply this principle to traditional school subjects it demands an exhaustive analysis of contents of units or learning atoms.
- Continuous active responding: the learner must perform some task in each step of the programme.
- Immediate confirmation: the learner should immediately know if his response is correct or not.
- Self-pacing: the learner must proceed through the instructional material at his own pace.
- Small steps: the learner must only be given the amount of information he can manage at each time.
- Validation: the programme should be tested by its application to selected samples of individuals within, or similar in characteristics to, the target-group and be implemented only after that validation.

Another important contribution for Programmed Learning came from N. A. Crowder, who studied and designed for the U. S. Air Force the so-called "branched programmes". In

this kind of programme the information given to the student is in much larger steps than in the linear programme, usually a whole page in length, followed by multiple-choice tests. If a given answer is correct, the student goes along the main stem of the programme (like in a linear programme); if not, the student is sent to other more basic parts of the programme which will give him the necessary foundations to proceed in the main branch.

There was for some time a strong polemic between "Skinnerians" and "Crowderians", claiming each one the exclusive virtues of their system; but consensus was quickly achieved which can be translated by the phrase: "All programmes are linear and some have branches"<sup>19</sup>.

#### *1.4.2 Programmed Learning and Distance Education*

At the end of the sixties, Programmed Learning began to extend to several media, to several situations and educational contexts, as if trying to transcend its specificity of learning "device". The point was not only the generalization of Programmed Learning in itself, but it also had to do with the generalization of the underlying principles and spirit. When they extended those principles, the "programmers", initiated the so-called —"Educational Technology".

Rowntree<sup>20</sup> bears his personal testimony of that process by reminding us the influence that programmed learning had on the development of self-learning methodologies, both in the rising British Open University and in other training contexts:

«Towards the end of the 1960s, like many of my colleagues at the time, I realized that the principles of programmed learning might have wider applications in helping people learn. I put them to use, and extended them, in developing the new approach that became known (rather unfortunately, I think) as "educational technology"».

Callender<sup>21</sup>, gives another view of this process of evolution:

"In 1960 programmed learning would have been described as a method of self-instruction, whereby the learner proceeds through instructional material in short steps at his own pace, receiving immediate knowledge of the correctness of his answers. Today programmed learning has become a process rather than a product. That is to say, whereas only a few years ago the programme consists of a book, (or pages presented on a teaching machine) it is now an integrated instructional system which may employ programmed books, teaching machines, film in various forms, audio-visual devices, simulators and actual apparatus. The instructor himself,

trained in formulating objectives and in diagnostic analysis of his teaching results, is an important part of this system.”

If we carefully look at the underlying principles of Programmed Learning mentioned above, we realize that these principles raised a set of questions in the fifties and sixties which would have wide developments in the following decades and that even today present some relevance. For instance, we can realize that the question of the operational definition of educational objectives is still a major point when designing and producing courses and materials in a distance education context. On the other hand, the problem of division and exhaustive analysis of the contents into units or learning atoms, as well as its sequential arrangement, are present today both in the global issue of Curriculum Development and in the more specific activities of multimedia courseware production in the general fields of Educational Technology and Instructional Design. Definition of course and unit objectives, the choice of the suitable size for a given unit, the conception of exercises and suggested tasks, etc., are strongly related to the classical requirements of Programmed Learning (whereby the student was constantly being asked to actively respond to certain stimuli); as it is the case for all questions related to feedback/reinforcement, still present in all learning problems both in conventional teaching and in the particular context of Distance Education.

In a distance education situation these problems concern the relationship between the educational system and the student and the relationship between the student and his course material. It is interesting to notice that, in its initial formulations, Programmed Teaching used to present the double characteristic of being simultaneously an individual and an individualized way of teaching.

Individual, as opposed to mass instructional techniques (e.g. film and video presentations, educational broadcasts, etc.) and to group learning techniques (tutorials, self-help groups, etc.)<sup>22</sup>. Individualized, because it enabled the student to learn at his own pace and even, in the case of branched programmes, to perform specific assignments according to his performance at each moment.

Having in mind the above considerations, it is expected to find several authors and theorists who make explicit reference to the influence of Programmed Learning on Distance Education. So, Keegan<sup>23</sup> points out that:

“[Programmed Learning] is a form of indirect teaching which has many similarities to distance education. Both demand extensive preparation of learning materials, careful sequencing and tend towards the individualizing of learning.”

Holmberg<sup>24</sup> shares the same opinion:

"It is not difficult to find parallels between distance-study courses and courses developed for programmed learning. [...] In particular, the possibility of providing immediate reinforcement in programmed texts has attracted the attention of distance educators."

In fact, programmed learning in its original form is today only used in very specific learning situations, such as to consolidate or to make some revisions of contents learned by other processes<sup>25</sup>. In spite of this, we should remember that most of the present programmes of Computer-Assisted Learning (CAL), in their versions of drill and practice, step-by-step approach and student full control, owe a lot to traditional Programmed Learning.

It should, however, be kept in mind that this method leads often to demotivation on account of boredom and clipping of the intellectual autonomy of the student, for it restrains any kind of learning through discovery by the student's own initiative or in any other way which was not foreseen by the programmer.

"In the light of andragogical theory, I have reservations about the use of programmed instruction as it has evolved to date, especially the linear approach. The very notion of terminal behavioural objectives is discordant with the concept of continuing self-development toward one's full potential. And the notion of some programmer predetermining what is desirable behaviour for an individual and then controlling the stimuli and responses so as to produce that behaviour conflicts with the concept of an adult as a self-directing organism."<sup>26</sup>

In view of this kind of criticisms the traditional Programmed Learning has been gradually replaced by approaches of humanistic or of cognitivist type and we see today the emergence of new ways of programming less dependent on the traditional stimulus-response theory. With respect to this, Romiszowski<sup>27</sup> sustains that, while Programmed Learning is dying in practice, there is something coming from its ashes:

«"New" programmed instruction (otherwise called "the systems approach" or "training by objectives" or "instructional technology" is defined in terms of a basic approach to problem-solving in education and training, involving the stages of: task analysis leading to course objectives, further detailed analysis of subject and student leading to draft exercise design, validation leading to possible revision and, finally, controlled implementation associated with long-term evaluation.»

In short, while programmed learning has been more or less abandoned as a method in most conventional learning situations, it can be said that its spirit survives in the distance education environment wherein a systemic approach is of current use. Following Richey (1986) "the systems approach reflects the basic notions of order and planning", which we recognize to be the major integrating values in distance education practice.

## 1.5 THE MULTIMEDIA PRINCIPLE

### 1.5.1 *Media in Distance Education*

We can say that the use of media is an absolute need in what concerns distance education. When Moore<sup>28</sup> defines Distance Teaching, he calls the attention to the inevitability of media in this kind of teaching, as to their function of replacing the teacher in the teaching process. He defines a distance teaching as:

"the family of instructional methods in which the teaching behaviours are executed apart from the learning behaviours, including those that in a contiguous situation would be performed in the learner's presence, **so that communication between the teacher and the learner must be facilitated by print, electronic, mechanical or other devices.**" (our underlining)

Holmberg<sup>29</sup> agrees in the following way:

"By definition distance education relies on non-contiguous, i.e. mediated communication. Thus, whether we are interested in technology as such or not, concern about media must be central to distant educators."

### 1.5.2 *Mediatization in Distance Education*

In Distance Education mediatization has as much to do with the contents as with the relationship with students<sup>30</sup>. This relationship may be or not mediated. This distinction between content mediatization and mediatization of pedagogical relationship has correspondences with the distinction Holmberg<sup>31</sup> has established between one-way traffic and two-way traffic:

"Distance education comprises one-way traffic by means of printed, broadcast and/or recorded presentations of learning matter and two-way traffic between

students and their supporting organization. The one-way presentation of learning matter occurs either through self-contained courses or, through study guides to prescribed or recommended reading. Most of the two-way traffic usually occurs in writing, on the telephone or by other media and, usually only secondarily and as a supplement, face-to-face.”

Trindade<sup>32</sup> considers unilateral and bilateral educational communications as being related to the possibility to distinguish between the functionalities available to the subjects located at the origin point and the destination point in a given communication link; thus, a conceptual difference is made between situations possessing or not a capacity for interactive relationship.

Two kinds of multimedia situations can result from the combination of the above mentioned situations. On the one hand we have multimedia situations which have only to do with content mediatization (or one-way traffic), and on the other hand we have multimedia situations which combine content mediatization with situations of mediatization of pedagogical relationship. In the first case we are facing a multimedia situation whenever, in a situation of content mediatization, more than a discourse or language is used. That is the typical case of multimedia packages which can combine, for instance, written texts with video or audio cassettes; another multimedia situation occurs when we combine a written package with some type of broadcast. In both cases we have a multimedia situation which concerns only content mediatization or one-way traffic.

This kind of considerations allows us to understand different levels of the pedagogical strategies to be used. A **content** may be conveyed by one or more media; a **pedagogical relationship** may take the shape of total non-mediatization (face-to-face tutorial situation); of mediatization through a single medium (the paradigmatic situation of correspondence teaching); or of a multimedia situation (e.g. by combining face-to-face tutorials with distance student support by phone; mailing, combined with phone; and a more elaborate scheme using Computer-Mediated Communication, intrinsically multimedia in character and interactive by nature).

### *1.5.3 Selection and Use of Media*

The convenience or the need for using media in distance education raises the problem of their specific choice and of the associated criteria of selection. Here we face problems

such as: suitability of a medium to specific contents, target populations, pedagogical objectives we wish aim at, cultural context, the practical conditions in which training is performed, costs (both to the teaching institution and to the learners) and attitudes and preferences concerning the use of media.

The question that has attracted the most attention from researchers and practitioners in distance education is doubtless the suitability of media to contents and to the type of cognitive operations we expect from individual learners. From this point of view, several media typologies have been proposed: one of the best known may be Gagné's (1965).

But, as has been stated by Holmberg<sup>33</sup>, many of these taxonomies are just partially relevant to distance education either because they do not take into account the specific conditions of distance education or because, taking only into account factors of psychopedagogical nature, they forget important variables such as the technical and economical ones or even their suitability to the several and specific target groups. Nowadays selection and use of media seem to be submitted to more pragmatic and empiric criteria, forgetting some academic discussions, which used to happen in the past years. We believe that the recent work by Bates (1990) presents an excellent review of the current knowledge, methodological approaches and technological developments relevant to the selection and use of media in distance education systems.

## 1.6 THE INTERACTIVITY PRINCIPLE

### 1.6.1 *Background*

It has been stated by Ely<sup>34</sup> that:

"in its simplest terms, interaction is recital activity. It is two-way communication between people and devices. [...] It is physical and mental function."

Interactivity may be immediate or delayed, real or virtual, direct or processed by media. The noblest and the most ideal model of interactivity is perhaps the human face-to-face conversation. Here stimuli and responses follow each other continuously, acting each one as feedback to the other; stimulus generates response, the response becomes a stimulus for yet another response. However, life shows how difficult sometimes conversational dialogue is: educational research has shown, for instance, that a very significant amount of questions asked to a student in a classroom are really rhetoric questions and tend more to

reinforce the unidirectional speech of the teacher than to stimulate a real and critical mental activity from the student.

As distance education is in a deficit situation in what concerns the opportunities for direct or immediate interactivity, one of its most interesting characteristics is to try, in a constant, explicit and systematic way, to stimulate what we would call virtual interactivity. This may be one of the reasons for the quality and success that distance education has obtained, namely due to the care and effort put into the production of pedagogical materials.

This is particularly clear in what concerns the written text: unlike books designed for a classroom context, distance educators have tried to develop a methodology for the design and organisation of written documents in order to elicit constantly the student activity by means of question posing, problem solving, exercises, suggestions for tasks and other pedagogical activities. These writing principles for self-learning materials in distance education were resumed by Rowntree (1986) in the following formula: "our aim should be to produce the written equivalent of a one-to-one tutorial". And if this is true in what concerns the written text, which is by nature a relatively "inert" medium, it is much truer for the other media, which are inherently more "active", even if they are not interactive.

Regarding what we called loosely the interactivity principle, we could still say it can stand as one of the criteria for media selection in distance education. We can state this, when educational situations (e.g. broadcasting versus face-to-face tutorials) and media (e.g. video cassette versus computer-mediated learning) differ in their interactive capacity, it is wise to compensate the use of media or situations which are less interactive, with the use of more interactive ones, whenever the opportunity arises.

### *1.6.2 Recent Developments and New Concepts for Multimedia and Interactivity*

The recent developments in this field seem to have a double slope: on the one hand there are changes related to what is considered as multimedia and to the characteristics of the interactivity of certain equipments; on the other band, there are remarkable progresses concerning telematics and Computer-Mediated Communication.

The emergence of new digital technologies brought important innovations such as hypertext and hypermedia systems<sup>35</sup> which have led to new products, as fascinating as the

Interactive Video. Barker and Tucker<sup>36</sup> foresee that "the videodisc will be joint in the next few years by a whole host of digital technologies which will unlock the knowledge of the world".

These recent developments are essentially the result of efforts made together by three industries that began to converge in the seventies and eighties: computers, television and publishing, potentiated by significant improvements in the telecommunications services. This convergence is enabling technological revolutions which exist at two levels: at the level of multimedia and at the level of interactivity.

Concerning multimedia we observe a tendency of evolution of the whole concept:

"In the 1980s the term **multimedia** (or multi-media) was widely and loosely used to define a collation of different media. [...] The term was being used to describe a package of information presented as a combination of forms: text, audio cassette, video tape, etc.

For the 1990s, with the arrival of personal computers possessing audio and video capability, the word multimedia takes on whole new meaning. This is because the personal computer makes it possible to access and manage a wide variety of media in ways which were previously impossible.

Suddenly the technology gives us the power to store disparate elements taken from different sources on a single storage medium, for example a compact disc."<sup>37</sup>

So we have a new situation: while not until a long time ago a multimedia system emanated from the use of different technologies and different support media, now we can have a multimedia package which is delivered by means of an only channel: the computer.

As for developments in interactivity we can say, in what concerns representation technologies or technologies to present contents, that they exist at several levels:

- At a first stage, which corresponds to initial attempts of programmed teaching and later on to Computer-Based Training, interactivity as a medium becomes a real possibility and not only a virtual one, by means of devices which are able to ask pre-defined questions usually under the form of multiple-choice questions or true/false questions; the user answers these questions and receives immediate feedback concerning his performance.

- With the development of artificial intelligence and of the so-called expert systems, which are by nature responsive and adaptative, interaction itself is changing. The question is not to simulate an interaction any more by means of successive feedback, but to simulate the reciprocity, which is a characteristic of the human condition. In this way interactive programmes appear: they are based not only on the correct or incorrect answer but on the level of knowledge the person shows about the target learning contents. It is a wide field of research and of recent applications which has been developed under the name of "student modelling" or "user modelling". In Winkel's words (1990) "The User Model is a data structure that reflects the assumed state of knowledge of the user concerning the target domain i. e. a specific application".<sup>38</sup>
- With the development of the so-called "authoring languages" the group - until now restricted to the "computer experts" – of those who can produce educational computer-based programmes becomes wider and there are also new possibilities for the consumers of those programmes. While in traditional Computer-Based Training the product is delivered assuming that consumers keep its integrity, with the new multimedia interactive products there is the possibility of changing the initial state of the product due to interaction. This gives birth to new and interesting problems about the authoring and the copyright of those products.
- With the development of hypertext systems, it is the nature itself of knowledge representation that changes, that is, the representation now becomes interactive. Knowledge is not in an unidimensional representation line any more: it is now represented in a multi-dimensional line by means of associative networks placed at different levels and changeable at any moment. Coming from a static representation to a dynamic one, interactivity now includes the representation in itself, meaning that it is no longer a question of interactivity between a person and any static material, but the inter-action between a person and a dynamic organization of knowledge, which becomes fully interactive.
- Another new development area has essentially to do with innovations in communication technologies: it mainly concerns advances in telematics as a convergence between developments in telecommunications and developments in computers. As Wenger<sup>39</sup> states:

[...] with telematics, the telephone network can be used, the system can be accessed at any time, there is no longer any distance between the school and the home, and it is possible to have information available on a general teaching discipline or have advice on a specific subject at the same time.

It is almost impossible to make a comprehensible balance about what is going on in this area, by combining telematics with the use of satellites, computer networks and comprehensive databases. There are many hopes, many inventive ideas and the experiences that are being made are several and very diverse. We can mention some of those possibilities:

- Educational actions via satellites, working bilaterally by introducing uplink facilities connected to terrestrial telephone or telematic networks;
- Educational databases shared by students and teachers/ tutors;
- Tutorial interactions between the teacher or the tutor and the individual student, or between those ones and groups of students either on-line or in delayed interaction.

Romiszowski<sup>40</sup> points out three kinds of consequences these developments can have for the future of distance education. From his point of view, on the one hand they widen the scope of use of distance education by increasing, at the same time, the individualization degree of the teaching process, and the autonomy degree of the student in the learning process. On the other hand, they may enable a larger decentralization of distance education systems and a higher personalization and flexibility of teaching. Finally, he states that:

"We shall see that distance teaching can be interactive, can involve groups as well as individuals, can be totally private and one-to-one when required and can be learner-controlled in all senses of that term."

To characterize the present situation of the use of media in distance education we could say that this learning regime is still mainly based on conventional technologies with particular emphasis on written text. In a worldwide research Perry (1984) refers that written text was used in 94% of distance education programmes; other most used media were audio tapes (40%), telephone (23%), videotapes (19%), kits (19%), radio (15%) and television (13%).

However, the technological revolutions we have mentioned will have important repercussions in distance education and we can foresee a re-configuration of the present situation. Nipper (1989) characterizes the emergence of the use of new IT&T. In distance

education as constituting a "third generation", of distance education, the first generation being correspondence teaching and the second one the era of multimedia teaching.

After all, one may say that even on those institutions which are technologically more advanced there is still a clear predominance of conventional technologies in distance education and, as Bates (1990) stresses, some institutions make only a marginal use of second generation technologies such as radio and television and base their teaching on texts, mailing and face-to-face interaction. In his opinion, it is not easy to innovate while assuring that the technologies to be adopted will satisfy functional criteria such like lower cost, greater teaching effectiveness and increased accessibility to students.

This author gives as an example of the difficulties of technological innovation in distance education the fact that in the last 20 years of operation of the first distance teaching University to be created, only audio cassette and video cassette have replaced, and only partially, the use of radio and television. In what concerns computer he states with some irony:

"Home computers will be next, but still only for a minority of courses and students, at least within this century, and it is not clear what, if anything, home computing will replace"<sup>41</sup>.

It is perhaps idle at this moment, but not totally uninteresting, to wonder if what brings quicker and wider contributions are the technologies that enable interaction and communication among the participants in the educational act (telematics networks, Computer-Mediated Communication), or the technologies for content mediatization (interactive video, CAL, etc.); these ones seem to face the permanent challenge of trying to replace the traditional written materials in book form. But even here opinions are divided. If for some people computer allows us to think of something that will be the "electronic book" which will pass over in almost everything the virtues of the traditional book just like we know it, for other persons the computer, as a content mediator, will never be able to replace it: it will be used in specific aspects of teaching, but will never become the main didactic component of the self-learning process.

We can run the risk of stating that the new technologies of communication, and not those of representation, will be the ones with a more immediate, quicker and wider future. We may also conclude that what is more common to these two tendencies is the growing possibilities of interactivity. This shows the full recognition of the principles of active pedagogy which have since long been defended by educators, pedagogues and psychologists.

### *1.6.3 Present Situation and Perspectives*

We may conclude that distance education has not been confined to assimilate and integrate the instructional use of media as it had been done so far. On the contrary, we can say that the development of distance education systems conferred another dimension to the problem of use and selection of media in education: the issue is not any more the individualized choices of a restricted group of teachers about certain aspects of curricula contents, but has to do with institutional decisions which involve course planning, which will have implications not in a single classroom or in a given school, but in target groups spread all over a region, country or continent.

We should also refer the emergence of a particular profile of experts, instructional designers or educational technologists: these persons should integrate course design and production teams in distance teaching institutions and also be included in organizations that, although not having a specific educational nature (Publishers, television networks, Software Houses, etc.) play a more and more important role in instructional design, in the production of materials for the industries of culture and leisure, in the improvement of media applications, in the creation of new media and multimedia systems, in professional training activities, etc.

## **1.7 CONCLUSIONS**

- Distance Education is a methodology designed for adult learners, based on the postulate that, given both their motivation to acquire new knowledge and qualifications and the availability of appropriate materials to learn from, they are able to be successful in a self-learning mode.
- Application of the self-directed learning principle to distance education allows the students some degree of self-determination regarding their choice of contents, place and pace of their learning.
- Programmed-learning as a general concept is suitable for integration within distance learning methodologies, namely regarding strict definition of tasks, modularisation of contents and the creation of opportunities for receiving feedback related to progress achievement.

- Availability of multimedia learning materials and the provision of telecommunication facilities for contacts between students and the learning system are necessary components of a successful distance learning methodology.
- Interactivity between students and the teaching agents, despite their intrinsic physical separation, may be assured through different technological means, its net result being an enhanced efficiency of the learning process.

## 2. THE LEARNING REGIMES

The existing distance learning institutions in the present educational scene show a wide diversity of learning regimes. These vary according to the objectives of the educational structures, its type and dimension, the target-population, physical and human available resources and the kind and diversity of the didactic materials they use.

The learning regimes may be exclusively based on the methodology(ies) of distance learning or may include to varying extent, elements belonging to conventional education to be used in face-to-face sessions. The development of new technologies applicable to distance education, as well as of new communication supports, enabled the diversification of the group of options and introduced new possibilities in distance education.

### 2.1 VARIABLES IN DISTANCE LEARNING

The traditional educational system usually has pre-defined learning regimes which impose severe restrictions on students in what concerns learning places and paces, curricula, teaching and study methodologies. Compared to this classical system, distance learning regimes introduce a highly innovator *modus operandi* based on the following variables:

<b>Who learns</b>	population potentially covered by distance education.
<b>Who teaches</b>	assistance and guidance of the student by the tutor/counsellor of the school, training centre or any other.
<b>What to learn</b>	selection of courses/curricula and related contents.
<b>When to learn</b>	period for course attendance, study and assessment.
<b>Where to learn</b>	places wherein to study (home, training centre, classroom, etc.).
<b>How to learn</b>	learning methods and techniques as well as the media to be used.

These elements vary according to the character of the institution. They can give the students a higher or lower degree of autonomy or a higher or lower interaction with the teaching system. The interpretation that the educational structure makes about these different elements, in order to adapt them to the students' needs and specific objectives, determines the existence of a diversity of learning regimes.

### *2.1.1 Who Learns*

Distance education aims at populations that, due to their spatial, temporal, economic and social restrictions, have no possibility to attend physically an educational institution. These are traditionally adult populations who have a professional activity. For this reason the number of daily hours that these "part-time students" can dedicate to learning is often quite limited. Distance education reaches populations that otherwise would have to give up their projects of professional or cultural improvement and contributes to equalize the access conditions to education and training. Finally, there are two special cases to be considered: on one hand there is a particular profile of students that actually prefer distance rather than presence learning, independently from their time availability; on the other hand it is conceivable that some huge conventional universities might be lead to teach some of their courses by distance education methods, in order to cope with ever increasing members of students.

### *2.1.2 Who Teaches*

In distance education the teaching staff is separated into two different teams, each assuring a specialized function: course designers, who define the methodologies, the contents and the final format of the learning materials; and the course tutors and counsellors, acting at a later stage to support learning. The objective of these latter is not to teach in a formal way (the result would be "doubling", the learning process) but to provide an individual guidance, to explain parts of the written texts or other mediated material, to lead discussions in groups, etc.

The counselling and tutoring may be performed by:

- correspondence - not only to clarify doubts and give some pedagogic or organizational guidance but also to provide comments on the scientific contents of assignments, tests, etc.;
- telephone - with the same tasks as the above-mentioned;

- face-to-face sessions in the headquarters of the structure, in study centres, or even in facilities external to the educational structure, such as companies, associations, schools, etc.;
- video/computer supports, by using new technologies such as video-conference and telematic networks, working on-line or by delayed e-mail, etc.

Tutoring and counselling activities are usually assured by the distance education institution itself. However they can also be performed, exclusively or partially, by trainers/tutors belonging to other organizations, such as private enterprise, public institutions, cultural associations, etc. In this last case the structure of distance education may provide special programmes to train the external trainers/tutors.

### 2.1.3 *What to Learn*

The changes of the structure of the labour market – both in national and in European-wide contexts – require new answers from educational and professional training structures. As a result of this demand, the distance education structures have been introducing new didactic contents in their curricula and defining new objectives for the available programmes; on the other hand, there is a growing number of training agencies and private training organisations which have introduced distance education methods and materials in their otherwise traditional ways of providing their services, the underlying reason for that being up to 40% savings in training overall costs. These new products may have been designed just to increase the efficiency of learning in face-to-face training situations or may be addressed to new profiles of trainees unable to follow presence training activities, mainly in a context of continuing education.

In fact, besides the traditional formal and non-formal education, distance education is particularly suitable for continuing and recurrent education and training. Not only are the learning regimes suitable to the needs of professionally active populations (spacio-temporal flexibility) but also the contents and formats of the courses are easily integrated in real training situations.

### 2.1.4 *When to Learn*

One of the most important potentialities of distance education regimes is their capability of adaptation to the global profile of students and to their individual learning paces.

The rules concerning the course length and its schedule (assignments, assessment, development of didactic units) will have to be carefully designed with basis on a quantitative evaluation of the course workload, i.e., the calculation of the average study hours spent on:

- Reading and study of written didactic materials;
- Listening to/watching mediated material (including radio and television broadcasts);
- Task performance and formal assignments;
- Preparation for examinations;
- Face-to-face activities (if existing).

As referred before, the course length and its schedule may vary in flexibility degree by giving the student a higher or lower autonomy in what concerns the educational structure.

The regimes that offer few or no temporal restrictions represent, on the one hand, an ideal situation of adaptability to the individual learning paces; but on the other band they run the risk of demotivating the student before the conclusion of the course because they accentuate the characteristic isolation of a self-learning regime. From this point of view, any increased level of flexibility leads to an increased demand of a high level of maturity and autonomy from the student. This kind of flexible regime also requires a higher response capability and adaptability from the educational structure (counselling, tutoring and examinations), which will have to adapt its organizational and management structure to the specific needs and paces of each of its students.

If, on the contrary, the course has a pre-defined length and schedule, it is advisable to use a pacing scheme, which may present different features:

- Regular delivery of the sequence of parts of didactic materials;
- Broadcastings schedule;
- Assignments schedule;
- Schedule for the compulsory face-to-face activities.

The efficiency of learning regimes depends, to a great extent, on the profile of the students the institution aims to serve (age, availability and self-learning capability) and on

their final objectives (to obtain a certificate or diploma, to up-grade, up-date or reconvert qualifications or just to learn interesting new subjects).

#### *2.1.5 Where to Learn*

In its very beginnings distance learning was supposed to take place at the student's home; but the intensification of the use of this kind of education in professional training and in continuing and recurrent education has imposed the diversification of learning places, by creating training centres in enterprise or public institutions, socio-cultural and professional associations, schools, etc. In this way it is possible for an enterprise to provide training to its workers without wasting time and money by displacing them from their workplace, on the assumption that the learner has, on the job, all the facilities, equipments and guidance required for his efficient learning.

#### *2.1.6 How to Learn*

Learning methods and techniques are one of the other innovations of distance education regimes. They are traditionally based on the individual study, in a self-learning regime, of a diversified package of written and mediated didactic material.

Sometimes the educational structure recognizes the need for presential activities as an efficient supplement to the self-learning process: individual or small groups face-to-face tuition, cycles of traditional lectures, group debates, seminars, summer schools (mainly when dealing with laboratory or experimental work), which may have a compulsory or a merely recommended attendance. This provides a realistic solution for the learning of some subjects that require the actual manipulation of equipments or experimental facilities, more than the awkward solution of providing the students with "home kits" designed to create a simulated experimental environment at the students' homes.

Obvious exceptions to the previous statement refer to the learning of subjects related to electronics or those involving the actual use of a computer, either as a learning tool or as the main focus of the subject, like in courses on computer sciences; in this case, the ideal situation would be to postulate that each student should own (or have ready access to the use of) a computer. However, if this is acceptable for courses leading to professional activities wherein the private possession of such equipment is a necessary requirement, this is not (yet) reasonable for any other kind of programme, due to the negative economic discrimination that such a compulsory requirement might lead to.

## 2.2 MODELS OF DISTANCE LEARNING REGIMES

The above considerations point out to a possible classification of distance learning regimes, according to the pragmatic way in which education or training organisations adjust their methodologies to the actual needs and profiles of their target populations and to the objectives and specifications of the courses they make available. From this point of view we can consider the following learning regimes, according to the degree of closeness they present in respect to a theoretical paradigm of distance education:

- a) The "pure" distance education regime: it is characterized by the fact that the learning process is supposed to be fully autonomous, without compulsory face-to-face contact between students and teachers (or among the students themselves); it is probably home-based and without any compulsory presence activities, with the possible exception of final examinations, for the courses that so require; the structure is supposed to maintain regular contacts with the students using different processes of distance communication, in order to assure some degree of interactivity; it uses didactic written or mediated materials conveyed by different media in order to be "consumed" by the student in a self-learning regime. Although opportunities for face-to-face activities may be provided, by individual tutors or in decentralized study centres, attendance is purely voluntary.
- b) Distance education regime with some elements of conventional (presential) education: it adds to the above-mentioned regime a number of elements characteristic of a "classroom" situation, as an intrinsic part of the learning methodology and, consequently, of compulsory attendance and participation by the learners, i.e. face-to-face lectures, debate sessions, workshops, seminars, working groups, experimental and laboratory sessions, study trips, etc. For this regime to be distinct from the next one, it should be characterized by the fact that the distance education methodology should be dominant in respect to the conventional one; a way to detect this dominance is the global weight of the respective activities workload, or the comparative number of weeks dedicated, respectively, to distance and to presence activities.
- c) Mixed regimes of distance education and conventional education: it being a hybrid case, there are many different situations to which this characterization may apply: a common one is found in some higher education conventional

institutions wherein complementary distance education programmes are offered to their students on a remedial basis or to take care of extra-mural learners; in training organisations offering intensive courses using distance education methods for some learning units and presence training for some others, according to their respective character; in many other education and training institutions, acting on a presential basis, but using mediated learning materials designed essentially for self-learning situations; etc.

It should be noticed that the existence of a significant weight of compulsory face-to-face sessions in a distance education regime is not a pacific theme. In fact some schools of thinking sustain that face-to-face sessions are essential in any learning process as they facilitate:

- The understanding of the communication process and human behaviour;
- The acquisition of habits and attitudes of relevance for the study;
- The mutual inspiration and motivation of fellow students;
- The training in co-operation, dialogue capability and critical judgement;
- The acquisition of verbal and argumentative capacities through the interpersonal classroom relationship;
- The integration of the individual as a member of the different groups he is supposed to belong to.

We did not include in the above set of advantages the obvious one of the acquisition of psycho-motor skills in experimental environments or of verbal competences in such fields as foreign language learning, for they are irrelevant for most subjects and learning objectives.

The reasons against the introduction of a significant amount of compulsory presence activities in distance education regimes are based on the consideration that face-to-face sessions tend to subvert the intrinsic nature of distance education; that they might weaken the students motivation for producing the required self-learning effort and delay the process of efficient transition and adaptation of study habits, from traditional learning environments and methods, to completely new ones. A much more obvious disadvantage is related to the difficulties or actual impossibility for a number of students to attend scheduled activities at a fixed location, on account of, among other reasons, their geographic dispersion, conflicting duties, or just lack of time.

The adequate integration of "face-to-face" and "distance" elements, as well as the objective and methodical planning of all the activities that should be developed, is the *sine qua non* condition for distance education systems to be effective and successful in their educational or training performances.

## 2.3 MODELS OF LEARNING ENVIRONMENTS

It is hopeless to try to describe and analyse all kinds of different learning environments that are currently in use in distance education and training contexts. Taking, however, the risk of over-simplification and of overlooking some possibly important cases, we shall propose the following characteristic for learning environments.

### 2.3.1 Home-Study Environment

This is the more clear-cut situation for the so-called "pure" distance education learning regime: students use their homes to study their learning materials, to watch and listen to video and audio didactic units, to operate their computer equipments and related courseware, to write assignments, questions or comments to be mailed to the teaching system. Due to the trivialization of recording equipments, the student is frequently no longer subject to strict broadcasting hours and may be totally free to establish his own studying schedule. Exceptions to this are the allotted times for telephone consultations with tutors and other agents associated with the teaching system and the infrequent compulsory assignments requiring the student's physical presence, like in final examinations or to attend summer courses.

The current improvement in quality and diversity of telecommunication services may contribute to reduce even more the need for physical displacement to contact the teaching system: instead of attending face-to-face tuition sessions, the distance education student may have access to the same kind of information through fax, E-mail and computer conferencing; the same means may be used to provide horizontal contacts with other students following the same courses, as well as for contacts among the members of the teaching staff.

It is of course tempting to try to avoid delayed interactivity as much as possible, postulating a person-to-person, on-line communication between the students and the teaching system, whenever the need is felt by one of these parties. Although this has been

tried on an experimental basis by different distance education institutions, it is difficult to postulate a generalization of this kind of facilities, their being both costly (either to the student or to the institution) and manpower-consuming when applied to a great number of users.

Keeping this kind of limitations in mind, it is generally accepted that, despite the very significant costs associated with the production of quality, specific distance education learning materials, one of the major advantages of a home-based learning environment is its resulting comparatively low *per capita* teaching cost, as it does not require a permanent allotting of physical areas, proportional to students numbers, dedicated to presence learning activities.

### 2.3.2 Training- or Study-Centre Environment

In many educational or training situations it is necessary to provide a dedicated space for collective presence-learning activities, even if a distance education-like methodology is in use.

This may occur for different kind of reasons. such as:

- The need to provide a technological environment for the learning activity itself, whenever it is not possible or realistic to postulate its creation at the student's home. This occurs both in formal education (i.e., experimental and laboratory subjects) and in training activities that require the actual manipulation of professional equipments;
- The need to provide a meeting place for students in a distance education regime, wherein they may find guidance and tutoring provided by the organisation itself, as well as some complementary facilities (library, databases, viewing and communication equipments, etc.). The same environment may be used for complementary learning activities, like seminars, debates and group work;
- When dealing with in-service education or training, where some part of the current working time is made free for educational purposes. A frequent arrangement is the provision of a training centre within the organisation premises, thus reducing waste of time in commuting between work and training places; flexible time schedules are usually considered for this purpose whenever a distance education methodology is used, based on a self-learning regime, supported by multimedia or interactive materials.

### 2.3.3 Hybrid Environments

A number of educational organisations operate in the so-called "dual-mode" regime, whereby distance education as well as conventional presence learning methodologies are used, either within the same programme or, alternatively, at different types of programmes; this situation occurs in many higher education institutions, as well as in professional training organisations. The dual mode of operation tends to stimulate some degree of mix (either conceptual or practical) between methods, materials and learning environments: this is a positive circumstance if pedagogical principles are respected in both types of activities, playing on the complementary advantages and disadvantages of the two modes of operation; or, contrariwise, a negative one, if specific methods, techniques and materials are used in both modes in an unspecific way.

In a more blunt approach, we could state that the "pragmatical" approach of using current didactic materials designed for a "classroom" situation, in a distance education programme; the making available to extra-mural students just the video and audio recordings of face-to-face lectures; the mere availability of multimedia libraries to whoever wants to browse interesting subjects and contents – **do not** allow such situations to qualify as corresponding to distance education operating modes.

From a different point of view, we think that conventional education, based on a significant amount of interaction between teachers and students taking place in school-like environments, will evolve in the sense of encouraging the students to include an increased component of self-learning activities in their daily routines, as well as introducing more flexibility in curricula, assignment schedules and progression rhythms. As an increasing amount of mediatized didactic materials, designed for self-learning, is being made available to students, the net result of this evolution will be for presence education to approach steadily the methodological principles-that characterize nowadays the distance education mode of operation.

## 2.4 CONCLUSIONS

1. Distance Education methodologies lead to a learning model suitable mainly to adults possessing both the maturity and the motivation necessary for self-learning; they require the use of specific didactic materials, usually in multimedia format.

2. Although allowing intrinsically for a high degree of flexibility in respect to schedules, rhythms of progression and learning environments, some of these degrees of freedom might not be in actual use, due to the specific organisational model of each teaching institution.
3. The nature and level of courses to be delivered, as well as the dominant profile of the target population, may determine different tutoring regimes, from the systematic to the purely occasional, and from the ones postulating compulsory attendance to the strictly voluntary ones.
4. Teaching and training organisations may operate in a single distance education mode, or in dual mode combining distance with face-to-face teaching methodologies.
5. Conversely, presence education institutions may come to adopt distance learning methods for some of their activities, the main factors for this evolution being the development of new communication technologies and a favourable attitude of the prevalent culture of academia.
6. Even taking into account all the possible fluctuations in concepts and actual solutions, distance education should be considered as a specific learning method by its own right, not to be identified with any kind of "simulation" of a conventional classroom situation, even if using some amount of face-to-face learning activities.

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