# Learning through Action and Cognitive Skills in Distance Education

Antonis Lionarakis
Assist. Professor of ODL
Hellenic Open University, Greece
alionar@otenet.gr

**Abstract**: Since distance learning became an inclusive educational and pedagogical entity, new codes, new data and new fixed targets have been created. The trial period is long since over, as are its first tentative years. The concept of "distance learning" has been put into practice in a large number of research programs and academic papers, pursuing different paths of application and practice. There are thousands of users who obtain and use educational forms and models from the concept of "distance learning" in a way such as to facilitate their work and research, while there are others who use "distance learning" as a vehicle of information and knowledge in ways, which suit their needs and respond to their prerequisites. In most cases, these instances are scientifically legitimized by the "alibis" of individual choice. If one takes the structure of a model of distance learning and converts it into pyramidal form, he must work quite analytically, by subtracting or perhaps adding to achieve the final form. This process could be likened to the work of the archeologist who attempts to recreate from the beginning an unknown mosaic, the pieces of which are given to him one by one. Composing the final image by subtracting and adding is a intricate, time-consuming and particularly complex task.

## Introduction

Thanks to information and communication technologies, new paths and innovative applications have emerged and distance learning has come of age. The tools of information exchange have been enriching, but one question remains to challenge the new generation of educators and researchers: 'how can students learn more effectively' or 'what is it that influences the quality of learning'. This text, having discussed a synopsis of the theoretical issues of distance learning, will attempt to discuss the field of human learning and the factors, which influence its quality. The last, not the first, question in the course of development of the text is "what students are able to do with their learning outcome" and this question determines all pedagogical and educational issues.

## Pedagogy and education: a short philosophical overview

Researchers into the philosophy of education are interested in several educational issues, which they investigate, so as to determine and interpret more clearly and analytically the questions of "how does education work", "what factors influence educational procedures and in what ways" and "how can they become more effective in benefiting students".

Therefore the researcher of the philosophy of education often focuses on only one aspect of the philosophy. If, for example, one is interested in learning issues and why some students learn more effectively than others, one would refer to educational and philosophical psychology to study learning theories, the external factors influencing learning, theories of human development and knowledge, forms and style of learning, motivations, the transfer and development of language and meaning and others.

The question, which often concerns researchers of pedagogy and education, is why some children or adults learn more effectively than others, and why some are more strongly motivated than others. Other corresponding questions will direct researchers to the study and analysis of abundant and unfamiliar scientific fields or at best, different to those with which they are already familiar.

Concerning the teaching of history, for example, they must refer to the philosophy of history, while for language issues they must study linguistics or sociological concerns and other specialized topics. If they want to investigate issues pertaining to how education should evolve, then it will be necessary to study ethics, economics, politics, social philosophy and sociology.

This way of thinking further reinforces the view that the pedagogical issues and pedagogical sciences, i.e. those concerning human development and knowledge, learning theories and teaching techniques, are intertwined with other scientific fields, which support and make up the wider sphere of interest in the subject. The dynamic which evolved from classic pedagogy and the progress in pedagogical sciences in recent decades, led to a new related field with plenty of common issues but simultaneously independent from the classic notions, that of education. Pedagogy and education are not the same, nor are pedagogical sciences and education.

The pedagogical sciences as a system of principles in a wider scientific field sprang from its initial position, due to the needs and daily school practices and became part of the other major contemporary social sciences. As a system of principles, it was not enough to study and provide solutions to issues concerning the sociology of education, the economics of education, the administration of education, educational research, comparative education, technology education, communication and other contemporary trends which were established in the educational sphere. Pedagogy and the pedagogical sciences, as an integral system of principles functioning independently for decades, focused on the social needs for educational support in schools. With an expanding scientific range, the system dealt with the educational needs of kindergarten and primary school teachers and to some extent secondary school teachers. However, the same educational and social needs in their turn defined certain essential parameters concerning the direction and development of pedagogy and the pedagogical sciences.

Contemporary sciences that have developed significantly in recent decades inevitably functioned alongside many pedagogical issues. Furthermore, in many cases they became the basic tools for the analysis and study of pedagogical issues. Sociology, for example, became an essential research and scientific instrument for our comprehension of the

social dimension of education with unequivocal references to political sciences, history, economics and social psychology. The same applied to the philosophy of education. As a research and scientific instrument, it aided in the understanding of the formation of educational content, with corresponding references to ethics, philosophy, theories of knowledge, and political sciences. The ancient Greek concept of education was "instruction" and it is a far cry from the contemporary form of pedagogical concepts of education and pedagogy. According to Hirst and Peters (1970), "education is a hybrid kind of activity. The philosophy of education is based on specific offshoots of philosophy and ties in with those parts which are relevant and help in the resolving of educational problems" (p. 19).

Educational and pedagogical concepts have always followed the general social and economic trends. One significant change to these concepts was brought about in the post-industrial era. When the educational needs of Classical Greece, the Roman Empire, Byzantium, the Middle Ages, the Renaissance, the Enlightment and Romanticism were tailored to suit the needs of industrial and technological development, the classical-traditional education was replaced by specialized knowledge and delineated skills. Hirst and Peters (1970), asserted that with the emergence of the industrial era and the increasing need for knowledge and skills, education became all the more connected with school training. This assertion, however, is only half the truth.

The educational systems of the northern hemisphere, alongside the growth and progress of the industrial era, acquired a rigid class nature. For about the two hundred years spanning the beginning of the industrial revolution of the late 18$^{th}$ century and the post-second World War era, the "universal right to education for all" was not the foremost concern of developed societies. It was a time when Anglo-Saxon countries spawned movements for the "extension of education" and initiatives by Western Christian Churches and organized communities for wider training and education. Such activities, to some extent, are still evident today although modified by changing circumstances.

Access to tertiary education, for example, has remained restricted to the few for centuries now, with some exceptions. Classical studies and an academic education were the keys to holding power positions in government and administration and to the growth of economy. Only in the second half of the 20$^{th}$ century did conditions make it essential for a flexible education adapted to contemporary social and economic circumstances. This period in the developed northern hemisphere saw the creation and growth of technical schools, technical secondary education, specialized tertiary (technical and non-technical) education, distance learning, professional training and life-long learning.

This period also reinforced contemporary tertiary education with a style and content consistent with the needs of the economy. While maintaining the academic content of courses with an up-dated look and flexible design to suit the new labour market, the university remains the central core of research, scientific knowledge and civilian education. As Carr and Kemmis (2002) report, "in the '60s, with the development in Great Britain of a new version of educational theory, the study of education on an academic level initiated a new, albeit extremely fragile, unity. Just as there was an

approximation of 'foundations of sciences', the various specialized scientific branches maintained their unique position but at the same time there was an attempt to create a common focal point for research interest, pertaining more probably to the nature, rather than to the practical aspect of the educational process" (p. 175).

Today, we differentiate between the concepts of "education" and "training" whereas in the past they were synonymous. The former refers to basic education and the organised educational system at all levels, while the latter concerns the development of skills and applications rather than specialisation. Of course, so as not to seem dogmatic or partial, their interpretation will always depend on the user and his point of reference, which may vary according to circumstances.

**Fundamental criteria for designing distance learning material: cognitive skills, knowledge and action**

Undoubtedly, all the criteria and premises, which take shape as distance learning or e-learning develops, confront a series of issues, which are all important. No one is asserting that the media and their potential are not important in comparison to the design and development of teaching material. The difference is that the pedagogical aspect of distance learning or e-learning cannot change as far as the basic principles of learning procedures are concerned. These last remain constant or they develop on the basis of documented research and scientific evidence. What can change and adapt to new factors and tools of information transfer are the particular issues of the adaptation of pedagogical matters to them.

With a new tool offering video-conferencing or new software for e-notes on a word processor, the basic principles concerning how the student learns do not change, nor are they affected. What does change are the requisite skills and how the student uses a tool to facilitate his study and make the learning process easier. As far as manageability is concerned, only the student can gauge from experience how helpful it is, or to what extent it facilitates his learning. However, educational expertise is required to determine the criteria and preconditions for the creation and use of these tools for an effective and flexible learning procedure, something that the student cannot do.

The basic principles of teaching material design of whatever form and content must be based on an analytical model of developed learning content. All of the required activities, which influence learning and have some important role to play in its procedure, must permeate the teaching material. Its designers should bear in mind all their theoretical and practical applications. Learning material – whether multi-media or printed – is supposed to guide the student, with no room for doubt, towards the acquisition of knowledge. (Lionarakis, 2001):

Students engaged in distance learning need to have an analytical knowledge, from the outset of their studies, of the following:

- What they should do
- Why they are doing it
- When they should do it
- How they should do it
- Did they do it right

From the early stages of study, students must expand their own personal tools that will allow them to function autonomously and independently, also in terms of physical distance from their teacher, in other words from the teaching procedure. Their field of study should be unambiguous and sustain their future plans. In order to develop analytical skills, which I will examine further along, they need to know exactly where their studies will lead. In other words, the what must they do, why, when, how, and finally, if they have done it right.

The above elements are definitive in the learning process because they operate for the entire duration of the course of study. In reality, it is the side factors that lead the students in being involved in a scientific field. The more analytically and descriptively they are presented to them, the more they will reinforce their engagement with the teaching material.

Activities and exercises, in accordance with the breadth of the subject matter as well as the targets and objectives of the material, should lead to the following:

- The utilization of existing knowledge and experiences
- The search for and processing of information
- Application
- Critical thought and creativity
- The verification and self-evaluation of knowledge and skills

The scientific field responds to a series of connections between skills, knowledge and behaviour-actions-attitudes, which have been determined by the specific academic community who designed and developed the actual teaching material.

In distance learning, the immediate involvement of the students to be creative, to practice and process data is a basic prerequisite for the acquisition of knowledge. The cognitive skills below are the essential tools for this purpose. From the moment the teaching material is designed to be used from a distance with the autonomous and independent involvement of the student, these skills must rely on a concrete foundation constantly available to the students and consisting solely of the activities and exercises to be carried out. (Table 1)

**Table 1.** Types of activities and exercises

| | TYPES OF ACTIVITIES AND EXERCISES<br>in the distance learning material |
|---|---|
| 1. | Utilization of existing knowledge and experience |
| 2. | The search for and processing of information |
| 3. | Application |
| 4. | Critical thought and creativity |
| 5. | Verification and self-evaluation of knowledge and skills |

Prensky (2000, p.156) asserts that in a series of learning procedures certain activities must be put into practice and reports that we all learn:

- Behaviors through imitation, feedback, and practice;
- Creativity through playing;
- Facts through association, drill, memory, and questions;
- Judgment through reviewing cases, asking questions, making choices, and receiving feedback and coaching;
- Language through imitation, practice and immersion;
- Observation through viewing examples and receiving feedback;
- Procedures through imitation and practice;
- Processes through system analysis, deconstruction, and practice;
- Systems through discovering, principles and undertaking graduated tasks;
- Reasoning through puzzles, problems and examples;
- Skills (physical or mental) through imitation, feedback, continuous practice, and increasing challenge;
- Speeches or performance roles through memorization, practice, and coaching;
- Theories through logic, explanation, and questioning.

Based on the initial consideration of Prensky (2000) and Anderson's comments (2004), we can work out the most important activities, which lead us to learning and to distinguish their differences by taking as a reference point the quality of the learning activity. The difficulty in assessing learning data lies not simply in responding to "how do students learn", but more specifically "in what way do they learn something", or more analytically "what must they do to learn". At the same time, within an educational framework, it is particularly important to respond to the final question: when students have learnt, what are they able to do with this knowledge? One point which Prensky's approach does not respond to is how will the student use the actual tools. For example, he says that the student will learn "procedures through imitation and practice" but there is no suggestion given as to how this "imitation" and "practice" can be carried out. Therefore, if we decide that the student must learn some procedures, the question is "what cognitive skills will he develop so that he can make these procedures his own?"

The second difficulty on a research and methodology level is the huge polymorphism of educational psychology and pedagogy. There is no constituted theory or analytical approach to the description and interpretation of data. Learning theories, descriptions and analyses of learning procedures are as abundant as the researchers themselves. In most cases, the researcher gives his/her own personal interpretation to cover the specific needs and issues of his/her subject.

To aid in the understanding and assessment of learning data, we choose its basic elements, which the student processes: skills – knowledge – action. These three elements are indissolubly inter-linked and function as communicating vessels, one presupposing the other. Knowledge, as a range of learning activities that operate efficiently and effectively, must be supported by a range of skills and especially cognitive skills. If the two are in harmony, they lead us to the third group, which are action, behavior and attitude. Cognitive skills are a prerequisite, they are the tools required to lead to knowledge.

**Cognitive skills**

Cognitive skills comprise a combination of information processing tools and all the data which one processes throughout one's life. Without the development of cognitive skills we have great difficulty in handling this information, in transforming it into knowledge and in being able to use it in the course of learning. However, before the slightest development in these skills is achieved, there are two basic elements, which help us to develop them: language and logic. The development and use of language, alongside the logical organisation of thoughts are basic prerequisites for building cognitive skills and exercising our ability to handle information. Both are in a process of continual development and they allow us to construct and use certain skills, which are vital for the acquisition of knowledge and the further evolvement of human activity, behaviour and movement. These skills are: creativity, judgement, comparison, contradiction, description, interpretation, analysis, argument, evaluation, examination, questioning, observation, oral expression and presentation, and problem solving.

**Concluding thoughts**

Cognitive skills respond to the question of "how do students learn". Cognitive skills in succession lead the student to knowledge and its three ingredients: the facts, the theories and the experiences and practical applications, which respond to the question "what do they learn". The third point, which makes the difference, in fact goes even further than the "valuable learning" of Vygotsky (1993) and expresses the actions, behaviours, principles and attitudes that the students acquire and are involved in. They respond to the question "what can students do with what they have learnt". In distance learning procedures, the answer to this question can confirm the conclusion of the educational process and complete the circle of knowledge.

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