

ECOPOLIS

Sustainable Planning and Design Principles

Edited by Dimitra Babalis



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LEARNING CITIES

BUILDING SUSTAINABLE EDUCATIONAL NETWORKS

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The era we are living through has been described by many terms which put at the center of interest Knowledge and Information. Thus, we often listen to people talking about Information Society, Knowledge Era, and Information Revolution, in an effort to designate their influential, according to many, role in our times. As much as general these characterizations may be, they are undeniably indicative of the fundamental importance the management of Knowledge has acquired, in every aspect of our society, not only in the economical, cultural and political domain, but also in our everyday lives. This brings about a come-back of the need to define the context in which Knowledge is acquired, generated, conveyed, managed and carried, in other words, Education.

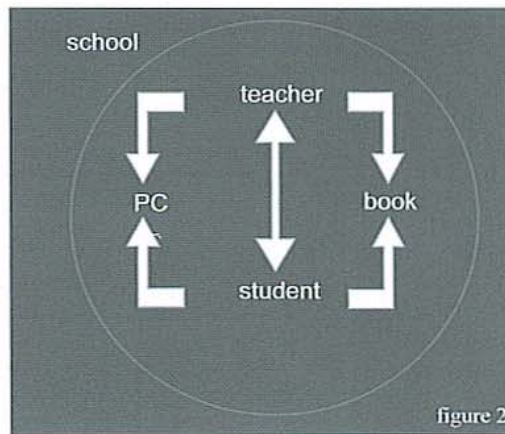
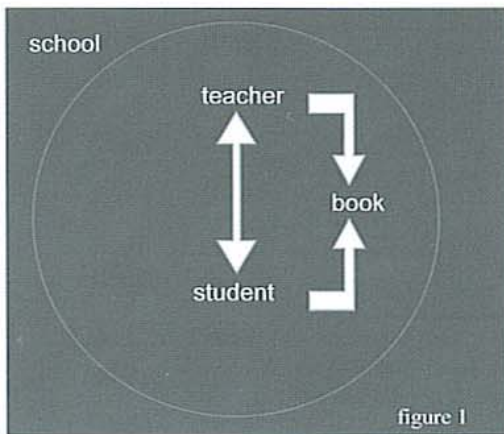
Speaking of Education, we have to acknowledge the polysemy as well as the implicit generality of the term. Although the scope of this project is not to seek the exact meaning and definition of education, we can agree with Dewey's aspect that education components are inherent in every communication and interaction between people (Dewey, 1916). Moreover, and this is significant for the content of the project in question, we can explain that, by using the term "education", we don't refer to schooling alone, since it is restrictive, "*it has a late beginning and an early end and in between it pauses for summer vacations and holidays, and generously excuses us when we are ill*" (Postman, 1996), while education in its wider meaning never ends and is never interrupted. This is the reason why we have to make a distinction between the actions which form the

designated *typical education* which include schooling and the formal educational system and those that constitute the *atypical* and non *typical* education (Κυπριανός, 2004), respectively.

ICTs and Pedagogy

Most of the changes taking place in the educational system are noticed in the domain of pedagogy and diversify the functions inside the educational institutions. In this domain, the spectacular progress that social sciences are experiencing helps us to evaluate and redesign the educational procedure, in proportion to the needs of every period. Thus, we can observe a significant turn from the mass character of education of the postwar period to the more individualized methods which place each student in the core of the educational procedure (Bertrand, 1992). Still, despite the important progress noticed in the fields of learning theories and instructional methods which constitute the object of study of pedagogy, till recently, in the structure of every educational institution depicted in the above diagram, relationships between instructor and students remained enclosed in it, with the intermediation of the unique and usually common for everyone manual, through which the homogenization of the educational contents was achieved. Thus, spatially located in the school building, the relationships inside every educational institution could be depicted by the figure 1.

However, in the last two decades, the startling growth and development of information and communication technologies (henceforth ICTs) led to the addition of another intermediating



element in the relationship between teacher and student, the element of the computer. The possible usages of the computer in education, as much as the effects of this medium in the aforementioned relationship, have become, for some years, an object of elaboration and study, allowing us to allege that we have already surpassed the first trial phase of its usage, and that we are in a period of review and evaluation of these applications in the educational procedure and of their outcome in it (Aviram, 2002). The confusion regarding the reasons of the ICT introduction in education and the ways in which they can be exploited, is a characteristic of this first period. Thus, even nowadays, in the numerous conferences organized dealing with this topic, one can notice the surfeit of starting points of the various approaches and, of course, the plethora of the respective opinions, as far as the desired results are concerned. Although the survey of the opinions relative to the objectives and the nature of the ICT introduction in education is not the scope of the present project, we epigrammatically mention at least seven different approach-

es (Aviram, 2002), in order to demonstrate the range of the specific problematic. Thus, there are approaches administrative, curricular, didactic, organizational, systemic, cultural and ideological. Equally numerous are the opinions regarding the desire of their adoption and the extent of the changes the new technologies can induce in education, therefore described as agnostic, conservative, moderate, and radical. So while the growing problematic has acquired a significantly wide range, the everyday educational practice has already adopted the ICTs (with a different extent from country to country) (EC) in two distinctive forms: as a teaching subject and as interactive means of knowledge, research and information, in every learning subject.

The first form is the simpler to interpret, as it considers ICTs as technological tools, the handling of which requires the addition of a further learning subject in the course of study, of informatics. Thus, the only change they can induce in the school system is the addition of certain hours in the timetable, the provision of computer equipment in a properly

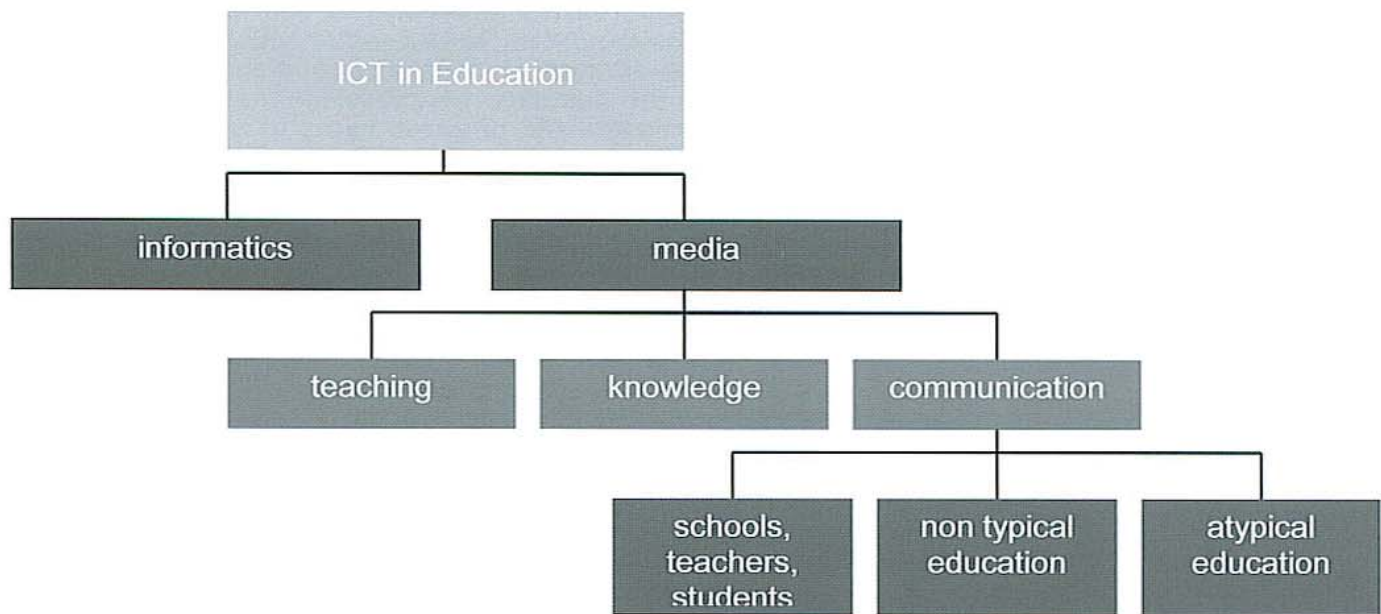


figure 3

formed laboratory, and the training of the existing instructors or others, more specialized, in the specific topic.

ICTs as Pedagogical Media, three distinctive parts

On the contrary, computers as media can play at least three different parts, the two of which are directly related to the respective parts of the teacher and the manual, as they are depicted in Figure 1.

Actually, it is possible to use the computers as teaching machines which can be considered to have a supplementary usage in the teacher's instructing work, while, in some cases, they can even substitute him. Furthermore, they present some significant advantages toward the respective early models of the '80s

which allowed a linear instructing procedure (Bertrand, 1992). The sector of educational software design is experiencing spectacular growth and the market continually expands with the introduction of new products. At the same time, the didactic methods which use ICTs, are considerably modified with regard to those applied earlier, from now on based on constructing knowledge models (Papert, 1980) and individualized teaching models. Thus, the changes that can occur in the role of the teacher are significant, including the possibility of not being anymore the single conveyor of knowledge, and become the manager of the educational procedure. In any case, however, the research in the specific sector supports that it is extremely difficult for the ICTs to compromise his place inside the mechanism, depicted in

Figure 1, at least in the foreseen future.

The second function of computers as media is related to the possibility of being viewed as sources of knowledge, directly competitive to books. The textbooks taught at schools have particular features, their contents are finite, they are controlled by the higher levels of the educational system, and the homogenization of the provided knowledge is obtained by their instruction in every school of the educational network. On the contrary, computers, either through software products, or, in a larger extent, through Internet, have access to an enormously wide range of information, which is, moreover, extremely hard to control. This access is very simple, often more inexpensive than the respective books, and feasible form everywhere and anytime. Therefore, the strong position of book, depicted in Figure 1, is undermined, with the existing, although remote, possibility to be completely substituted by the computer.

The transformations that can occur in the instructional procedure, as a result of the implementation of the aforementioned ICT features, are extremely significant and can affect the structure of the scholar curriculum, thereby changing the way in which the school works. However, and despite the dialogue that has been going on for decades about their applications, the deficient study of overall proposals, combined with the reaction often caused regarding their adoption by the educational community, has led to their isolated application, while more complete proposals are being made only in an experimental level. The reasons for this inactivity can be traced to the generally slow

pace in which the instructional methods are changing, not only because of the established system, but also because of the inability of these media to determine the progress by themselves, that is to say, without it being specified in a wider frame (Robertson, 2003). Still, they can act as accelerators, so that essential goals of the educational procedure are attained, with more important the development of the learning skill (e-learning Action Plan, 2004). The particularity of the objective "of learning how to learn" lies in the fact that while it is the most modern objective, since it is mentioned in every education related edition of the past years, it also remains one of the most historical, since Humboldt refers to it, already from the beginning of the 19th Century. These two features of computers, as teaching and knowledge media, help us realize that the ICTs cannot by their own change the actions within the school organism, in a significant way, as it is depicted in Figures 1 and 2. This demands the overall redirection of the system, from the top of the hierarchical pyramid, in which the new media can act as accelerators, by means of their already described features.

The third function of computers as media is the one which doesn't correspond to any of the former phases of the educational procedure as it is schematically portrayed. This is due to the fact that it refers to their abilities of interactive communication and cooperation in networks, factors without which, they would remain unconnected. This communication can be organized, with clearly defined educational goals, and in predetermined frames of time and space, but it can also be unsystematic and sponta-

neous. Moreover, it has already been developed in a fairly large extent, shaping a new situation in education, which is an important object of study. By making an effort to group the abilities of communication and networking the ICTs offer to the educational procedure, we conclude to three broader categories as far as the features of the parts they connect are concerned.

Communication and Network

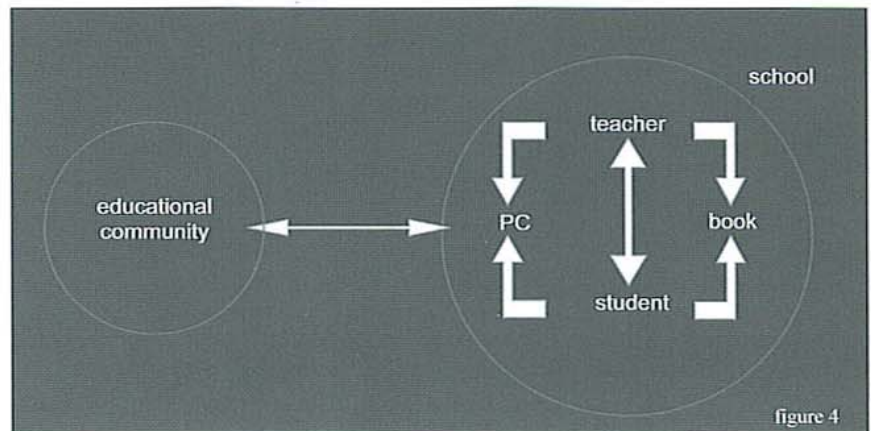
The most usual communication form is the largely organized networking, either of schools, or of teachers and their students. Such networks have existed for almost a decade, with goals defined by their inspirers, who are often members of the typical education system. These networks may have either local range, connecting the schools of a particular community in common actions, or national range, in case the networking of every school in the country is attempted based on specific programs, but also international range, promoting in this way cooperation between schools at different countries all over the world. Similar to these aforementioned networks are the ones established between teachers of local communities, countries, and international associations, while smaller is the spread observed in networks that are established between students. The creation of such networks is organized either by the same agents who are also responsible for typical education, therefore, they are part of it, or, it is organized by individuals or groups of persons with common features, something that makes these networks much more interesting. In this case, the structure and objectives they are

asked to serve may vary, thus offering the power to diversify themselves from those specified by typical education.

A second communication field is the one established between the official educational system and a much more complicated network, the network of the non typical education, which is composed by a plethora of organizations, companies and bodies, which, some of them directly while others indirectly, take action in the domain of production, management and transmission of knowledge. The intense switch of the western economies character, during the second half of the twentieth century, from industrial economies to economies based on the provision of services of intensive knowledge, has led to their characterization either as economies based on knowledge (OECD, 2001), or as informational economies (Castells, 1989). This transition induces, and at the same time is fed by a significant growth of the broader educational sector, since the constant updating and adjustment to continuously changing data is considered to be crucial. In its turn, this leads to the need for a perpetual, Lifelong Education, which reinforced by man's inherent inclination toward self learning (Κορωνάτου, 2001) makes its coverage impossible by the existing educational system. This particular void is about to be filled by a series of heteroclite, at first sight, and unequally weighted, as far as their role in the network is concerned, organizations that provide specific knowledge and education on this knowledge. Among them, important place is occupied by cultural institutions with changing character, such as the museums and libraries, which dig-

italize their material and provide educational programs. Respectively, foundations such as institutes, scientific labs and universities use the ICTs in order to network and exchange knowledge in a much wider community, while they are collaborating with various companies which, in their turn, take full advantage of their results. Similar collaborations are exploited by software production companies, which, in their turn, feed a new circle of education about their programs. Among them, as far as the treated subject is concerned, a special role is attributed to companies developing educational software, or designing computer games which comprise educational features, while they are directly related to the evolution of didactics, as it is aforementioned, and since their products are used by a great number of young people who go to school. Equally significant is the role of the Mass Media, which, apart from being important for information and communication, they have also entered the ground of education, providing a series of educational programs. A full tracing of the field of non typical education would definitely include a plethora of other organizations that would make their survey almost impossible.

The last communication type provided by the ICTs to the educational procedure is the one established between schools and broader social groups. We have already mentioned that every human contact and communication constitutes a type of education, but in this category, we could distinguish various, more specialized institutions, functioning without regard to education, but with a specific interest in it, such as the local government and dif-



ferent other organizations and associations, overall constituting a broad network of atypical education. This kind of connection can be extremely important for the role the school will have to play in the future. In this category, we could include the ability of interconnecting the typical educational procedure to individuals, who can either simply be informed on the school actions, or can actively participate, not only contributing to the educational procedure with their knowledge, but also taking advantage of it, through distance learning programs. These multiple possibilities of interconnecting schools through ICTs, have the power to significantly change the way in which the place of school is viewed inside the social system. This is due to the fact that, before the use of the ICTs, the structure on which the school was depending and from which it took directions, was hierarchical, while its relations to the broader environment were limited and predetermined. However, by adding the computers in Figure 2, school gains a connection to the environment outside itself, but which offers innumerable possible choices

(fig.4), while the fact that this connection is implemented separately for each school, namely at the base of the aforementioned pyramid, is very important. A result of these multiple interconnections between school and other bodies is the infiltration into school, of an entire education network, which makes it difficult for it to manage and assimilate the powers this network exercises in its interior. In this way, the limits between class, school, and the broader educational community become blurred, posing questions regarding the role of the school in the network. This is due to the fact that while we can consider the school as part of the hierarchical system of the typical education, we have to acknowledge its place in a broader and complicated education network, only a part of which has been described. In order to make this happen, it is important that we comprehend the structure and development of such a complicated system, since it is not random, as it may seem at the beginning.

Scale-Free Networks

The components, namely the nodes forming the educational network, as it has been described, are all the schools and educational institutions, as well as every organization, body and company, taking action and being interested in the field of education, as much as the typical, as the non typical and atypical education. The bonds which turn them into network are the connections that can be implemented between them, accomplished by the use of ICTs and, particularly, the Internet. However, all nodes do not have the same number of connections

between them. There are namely popular nodes which present a significantly high level of interconnection, called hubs (as, for example, the portals of educational organizations), and others, very secluded, such as certain schools. Because of this fact, the educational network's structure is not random, but it develops without scale, as it is dominated by the central hubs (Barabasi, Bonabeau, 2003). The development of a scale - free network is based on the logic of the selective connection of the new nodes to the existing hubs with the higher interconnection. At the same time, different nodes can present a strong interconnection between them (for example, collaborating schools on an ecology matter), forming a cluster, some of which hubs can be connecting to other relative clusters (museums of national history), which in their turn, will be connected to other cohesive groups (biological research centres) etc. In this way, the network is dominated, at the same time, by hubs with high interconnection and by clusters of hubs with strong connection between them, which means that it is simultaneously clustered and scale - free (Barabasi, Bonabeau, 2003).

Scholls as determinants hubs, reinforcing school's social role

The identification of the school's place in a network like this imposes the revision of its role in the educational system. According to Musgrave, the educational system fulfils social functions and when the system's functions are in harmony with those of the society, then the system works properly, whereas, when they stop being harmonic, there is malfunction-

ing and, consequently, need for changing it. Moreover, we have to acknowledge the fact that the adoption of technology doesn't deterministically lead to wider changes (Postman). In this context we have to apprehend the changes occurring in school, not as a product of the ICT implementation in the educational procedure, but consider their introduction in it as a means of attaining wider desired changes. Nonetheless, their integration in everyday educational practice, without a former systematic broader design which would predetermine the desired objectives, worked, as we already saw, as a Trojan horse, posing imperative questions about the school's role in the society and its place, not anymore as a discernible institution "confining" young people (OECD), but as a hub of a broad network with blur limits, opening, at the same time, important perspectives. Therefore, it is necessary to define the desired objectives we can achieve by serving wider social needs, taking under consideration the enormous possibilities offered by the use of the New Medias.

Having already mentioned the switch of the economies, from the industrial model to the service providing model, we cited the importance Lifelong Education acquires in the economic conditions of our time. In this context, it is easily perceivable that the limited education, having as only objective the transmission of knowledge and taking place inside schools, is an incomplete procedure, since it is unable to cover the extent of knowledge that a person will have to assimilate, in the rest of his life. In this procedure, school has to be considered as just one hub in the much broader

network which constitutes education today. Furthermore, the extent and the structure of the previously described educational network makes obvious the marginalization of the school in a node with low interconnection, if the transmission of knowledge and the certification of its acquisition remains its exclusive purpose. This is due to the fact that its abilities can't be compared to the ones of other much bigger and wealthier institutions and organizations that present high interconnection. The realization of all these comparisons allows for the school to redefine its role, so that it meets the needs of our times, reinforcing in this way its place in the network. Through a series of probable scripts about this evolution, and based on everything we've mentioned regarding the educational system, it is made clear that, in order to become an influential hub in it, the school will have to reinforce its social role. For this to happen, there is no need to ignore its learning role, but it can change its character by offering benefits to non measurable fields, such as the one of the learning ability that was aforementioned, liberating itself from the need of transmitting and certifying knowledge.

In this way, it can be transformed to an institution where meetings, development of relationships, collaborations and game will not be random and fragmentary, but will be designated as its most significant element. Namely an institution that will aim especially to the socialization of young people and that will encourage their social action.

At the same time, by reinforcing its social role, school can become the interaction centre, not only between

young people, but also of the wider community where it belongs. Having realized that the seclusion of people and the remoteness from the social actions of the last decades threaten the sustainability of local societies, the revival of the public space use is considered imperative. School could take advantage of its pervasiveness in the aforementioned societies, based on the location of school buildings at nodal points of residential areas, and the ease of establishing social relationships between children, in order to become a central social centre. The aforementioned, already developed interconnections of school could be reinforced and, through its connection to respective local social institutions, it could possibly create local networks around it, aiming at the strengthening of local relationships. Thus, it would transform in a school that wouldn't function "for", "with", or "instead of" the community, but in a school that would function "as" community, namely as an Educational Society, with the wider meaning of this term.

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