SEARCHING A NEW LEARNING METHOD: HYPERMEDIA SYSTEM

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Abstract

The use of computers is commonly available to students of architecture nowadays. They can learn specific packages of software and their application in several fields. Very few concern is given, however, to the pedagogic capacity of the use of computers in architecture: They are teaching how to use computers instead of using computers to teach. Interactive multimedia and information highways capabilities are to help to the use of computers not only as productivity tools but as mean of communication and education tools as well.

Introduction

This paper deals with the introduction of hypermedia technologies in architectural education as well as their application in the continuous learning of graduate architects
The use of these hypermedia systems in teaching process of architectural technologies may be an answer to the increasing number of subjects that an architect has to know and the decreasing period of university formation.
The implantation of computers in classrooms either as a production tool and a learning one is considered in our contribution. Besides it sets up a possible step by step plan to allow that integration.

The learning personalization

The use of non-presencial personalized learning systems can be easily accepted by architects as an efficient training tool that allows them updating their professional knowledge. A different attitude can be found in a great part of lecturers. In our experience there is a considerable resistance to assume and use (even as an experiment) systems based in interactive multimedia tools.
Any teacher wishes that all students could attain a satisfactory knowledge of the subject they are teaching. Personalized learning systems, those that consider each person as the final goal of education, seem to be the model to come after, even being aware that it is very difficult, if not impossible to reach. In fact, group activities are if not the only the most common way. Nevertheless the matter is not, thinking of individual learning in its most strict meaning, but focusing on how to introduce a strategy of personalization in present group model.
Common uses in education are based on real presence of teachers and students. People living not close to traditional universities can not improve and update their knowledge without making a serious effort. Graduation is not the final stage of a learning process. On the contrary, it implies the necessity of a regular up to date. To do this, there might be some educational resources available that the user could access directly, These resources would allow a flexible utilization. Flexible do not only means free choice of location and timetable, but choosing the own learning pace as well. Many specialists in pedagogic and training point out that the way to reach this goal leads trough an open and non presencial education. "Open" means flexible and accessible. "Non presencial" does independence and autonomy. New information technologies would suppose inside this educational model the foundation on which is based the most complete and capable tool for this kind of formation: Hypermedia Systems [Sanchez 1994].
Bibliography on pedagogic repeatedly highlights the benefits of the use of Hypermedia Systems in student’s performance. We quote A. Sobrino (1993) "development in training methodologies design and technological innovations did considerably improve the efficacy of personal learning methods (programmed learning, hypermedia applications...) A hypermedia system can be a valuable instrument to apply these learning personalization systems, that have been based on traditional textbooks up till now. The indubitable advantages of managing information provided by Hypermedia Systems are to help the personalization of learning.

Continous training

Because technological development, architecture students have to face, the necessity of learning an increasing amount of course material. At the same time, the time of formation spans for a period that does not increase in parallel to the amount of information and in some cases (Spain is one of these) it diminishes instead of increasing. The importance of having means to update technological knowledge after the end of academic education can be appreciated in daily work.
Dizzy development of technologies overcomes architects training, at least in some fields, few years after the end of their studies. The knowledge and up to date of new advances should be spread systematically to make them available to professionals.

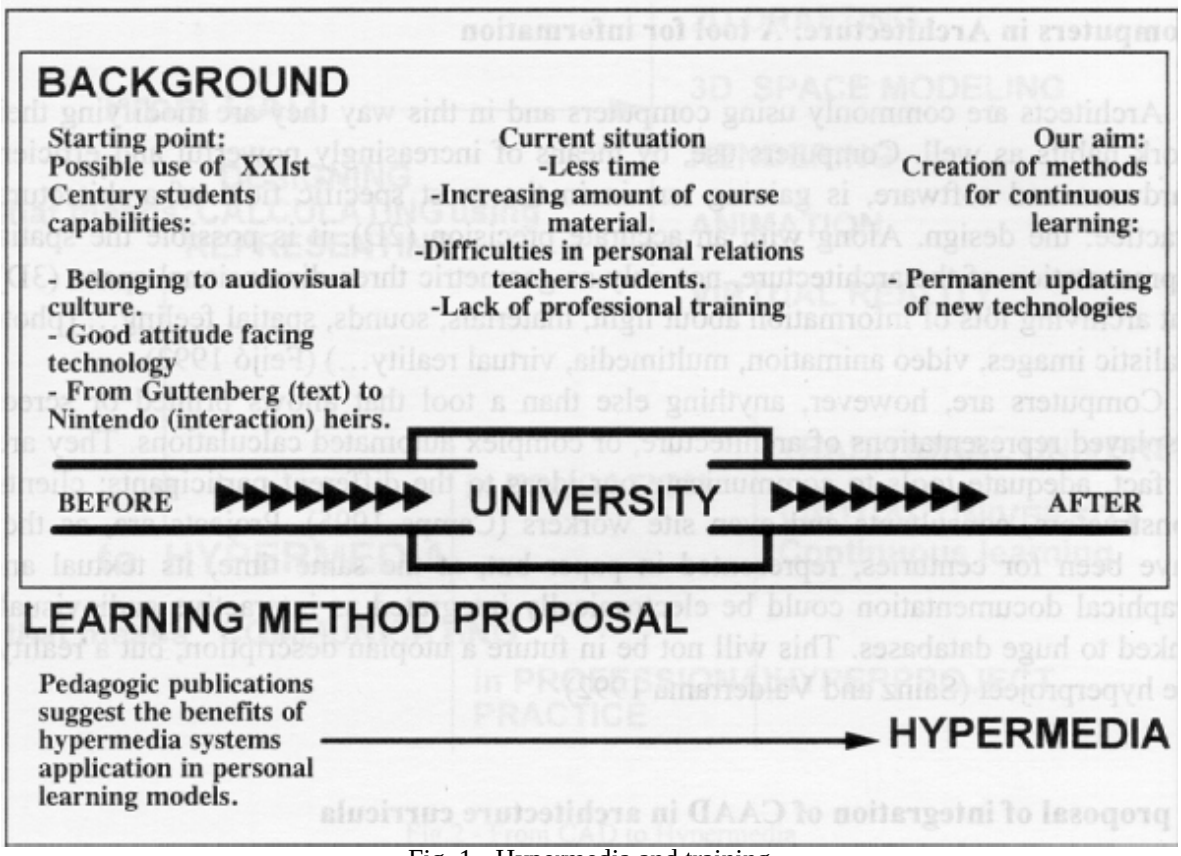


Fig. 1 - Hypermedia and training

According to all evidence, five or six years of academic formation are not sufficient time and all concerned parties are looking for a solution.
To solve this problem, we must find an adequate training tool for professionals. The necessity of overcoming this barrier is shared by both, architects professional associations and universities. Spanish corporate associations of architects (Colegios Oficiales de Arcfuitectos) are presently proposing the creation of centers of advanced studies ruled by the existing CAT (Centros de Asesoramiento Tecnologico or Technological Assessment Centers). These ones should organize courses available to all professionals interested (Arizmendi 1994) or promote the development of electronic catalogs accessible by means of information networks (Valenciano 1995). Otherwise, in the case of the universities, master and other post grade courses are present answers.
In a recent paper submitted to a Congress on Technology in Architecture organized by the School of Madrid the author, Prof. Ramos, who is the president of the Consultant Committee on Architectural Education of the European Union asked to university educators the preparation of textbooks a concrete and prompt answer to the questions that are currently arising in architectural education (Ramos 1994)
These new textbooks should be created and published, not only as printed books, but as well in the new multimedia formats that can be integrated by means of information technologies: video, motion and still image, sound, interaction... These electronic textbooks must be edited by university teachers, and used by them to contribute to personalize the education during the university period. In that way future professionals will be used to have their formation updated – "at home" – by means of the imminent information highways (Bustinza 1995)

Computers in Architecture: A tool for information

Architects are commonly using computers and in this way they are modifying their work habits as well. Computers use, by means of increasingly powerful and efficient hardware and software, is gaining terrain in the most specific field of architectural practice: the design. Along with an accurate precision (2D), it is possible the spatial representation of the architecture, not only as geometric three-dimensional space (3D), but archiving lots of information about light, materials, sounds, spatial feeling... (photo realistic images, video animation, multimedia, virtual reality...) (Feijo 1992)

Computers are, however, anything else than a tool that allows printed or screen displayed representations of architecture, or complex automated calculations. They are, in fact, adequate tools to communicate our ideas to the different participants: clients, constructors, consultants and even site workers (Camps 1995). Projects are, as they have been for centuries, represented in paper but, at the same time, its textual and graphical documentation could be electronically integrated as interactive audiovisuals linked to huge databases. This will not be in future a utopian description, but a reality: the hyperproject (Sainz and Valderrama 1992)

A proposal of integration of CAAD in architecture curricula

One of the main goals of a teacher is the best formation of professionals, capable and competitive. It seems that computers must play an important role for this purpose. On one hand as a work tool in the design, calculation or development of a project. On the other hand, as said above, as a communication and learning tool.
Both capacities of computers – the informative and formative one – should be used in architecture studies since the first academic year. Computers should be used in a first stage as production and representation tools as well as exploiting their calculation capabilities. In a second stage all their automation tasks are to be used in such fields as structural, mechanical calculations and budget estimations. Project's ateliers should be once again the commonplace where students could develop, by means of CAAD, what we could name "hyperprojects". In a third level, the post grade one, an important orientation of doctoral thesis and research projects should be the development of learning materials based on hypermedia systems.

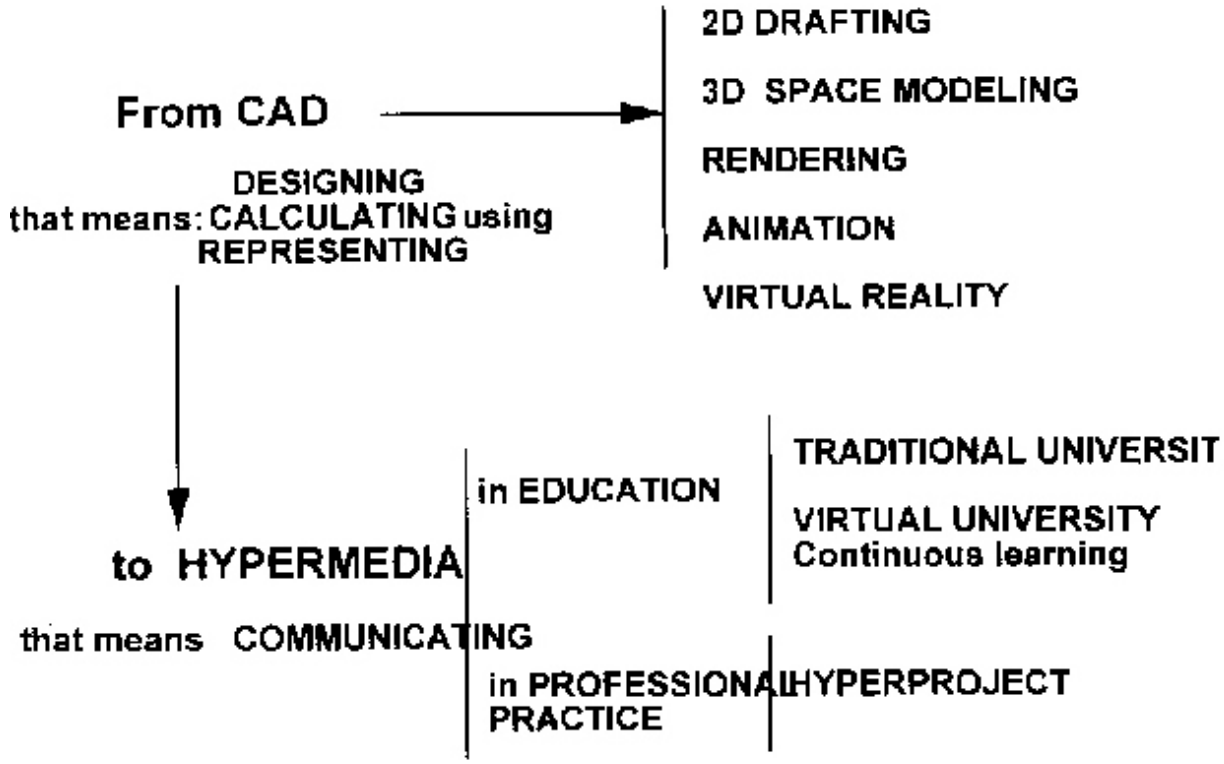


Fig.2 - From CAD to Hypermedia

No sooner had all or, at least, an important part of these materials been created than computers will be, in addition to graphical or calculation tools, learning and communication ones. Individual interactive training will be an important part of the learning methodology both in academic and post grade periods aiming to something that, if not nowadays, in a near future will be called "virtual university" (Barret 1992).
This radical position on the application of information tools in architectural education could be considered as wrong as starting the construction of a building by setting up its roof. However we believe in the importance of understanding the problem as a whole. Sometimes, when looking for a place for computers in architectural education, there is the danger of thinking of this place as a niche or a kind of pigeonhole among other subjects. Narrowing in such a way the vision of the problem could hide the final goal. Lets think, for instance, about a common question: Would students loose capacity of projecting when learning the use of computers since the first year? In our opinion this is a non sense debate. People in favour or against will never agree on this. The reason could be that there is no way to demonstrate neither of both positions or, perhaps, that there is no relation at all between the ability to drawing using a computer and the capacity of being a good architecture designer.

Electronic book about Reinforced Concrete in building construction

At the end of this long way a complete system would be available both in university education and continuous post grade training. But this is a task for a great number of people working for years and even decades. We only want to make a

modest contribution to this work. To reach the summit there is always a first step. It seemed to us that the edition of an electronic book, considered as the evolution of classical textbooks, could be one of these first steps

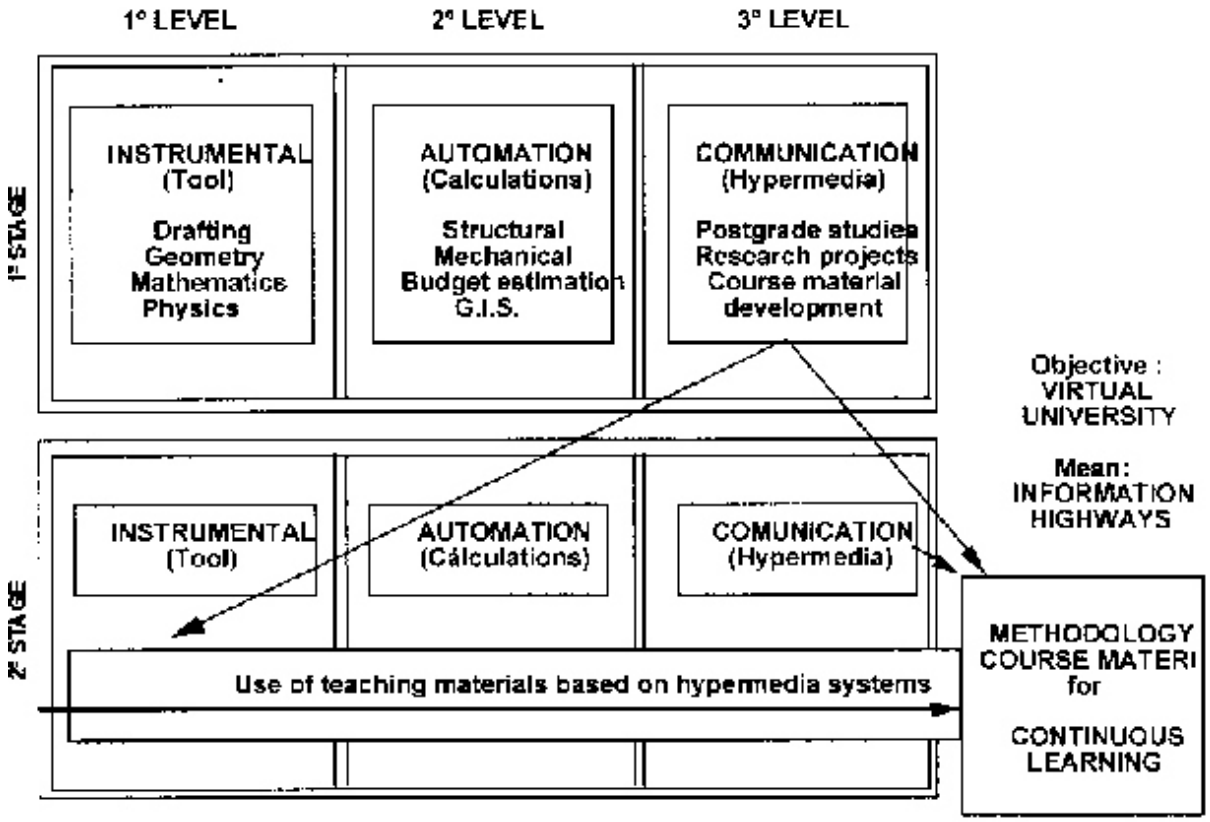
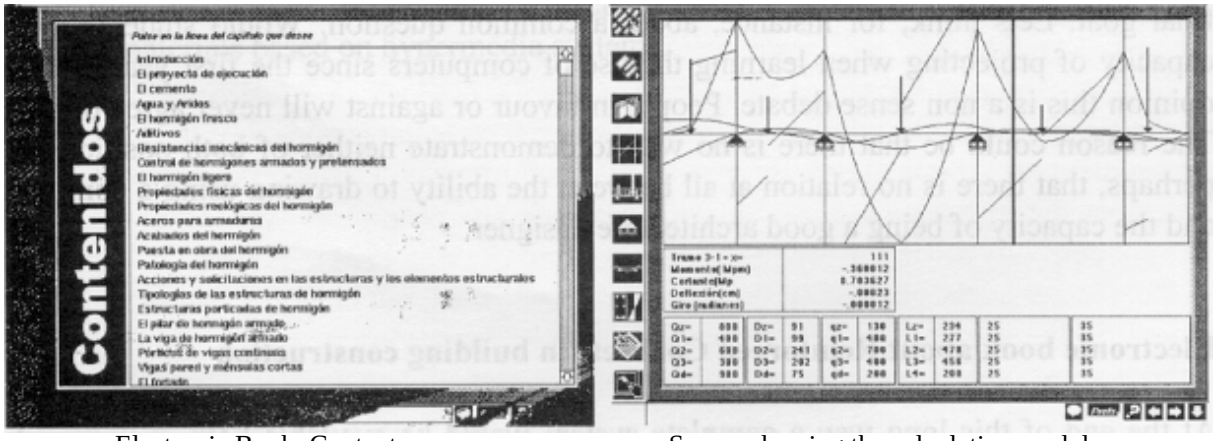


Fig. 3 - Computers use integration in technical university studies

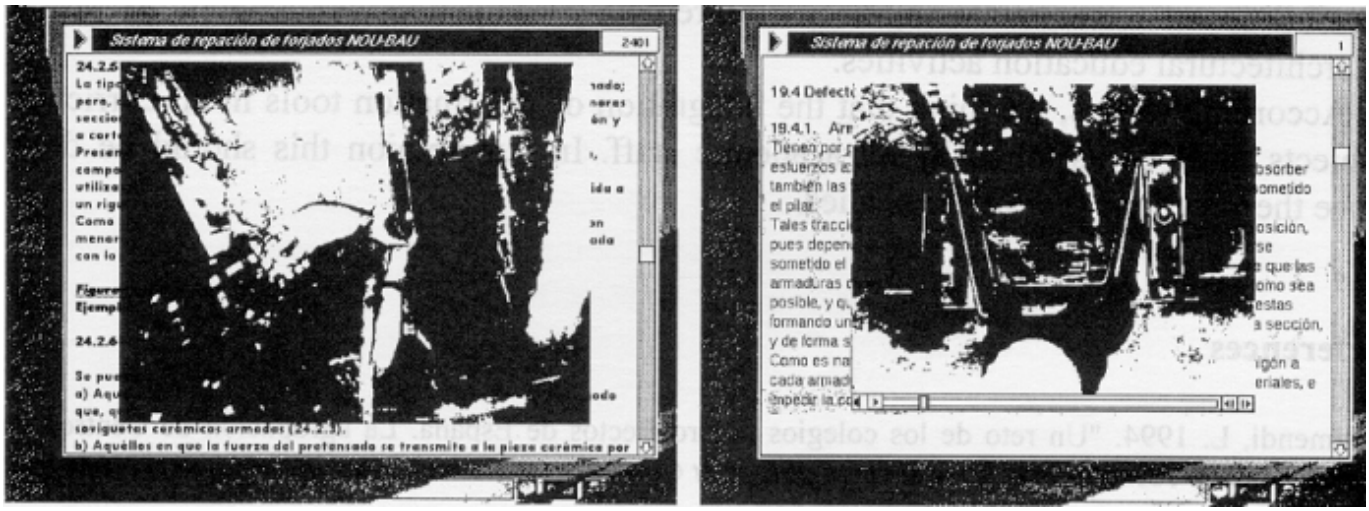
We describe bellow this experience in the preparation of an electronic book on reinforced concrete structures in building construction. It is being developed by one of us as a part of his doctoral thesis. This development is based in an existent textbook (Pellicer 1990). As an example we will describe a chapter about slabs. In it main characteristics, different typologies and pathologies are analyzed and discussed.



Electronic Book: Contents Screen showing the calculation module

Fig. 4a - Some of the screens used in the electronic book on reinforced concrete

This electronic book is being developed in Macintosh platforms using Hypercard and Director. The structure of an electronic book is in some way similar to that of the traditional ones. It allows however the access to a databank of still images and video animation linked to keywords and to topics described in the text. Control tests are available for students in each chapter. Some images shown in this paper belong to that development.



Photograph linked to a text Digital animation linked to a text

Fig. 4b - Some of the screens used in the electronic book on reinforced concrete

This development is a part of a more comprehensive hypermedia system that has been discussed above. By using these systems students should assume that they are entering a virtual university. The success in experiencing "immersion" depends mainly in a sensible choice of the setting up of our proposal. It is represented in the graphic shown in the Figure 3. In the "virtual university" we try to emulate a traditional one, but only in its functional structure as the support various interactions Barret (1992) and not spatially modeling it in the computer.

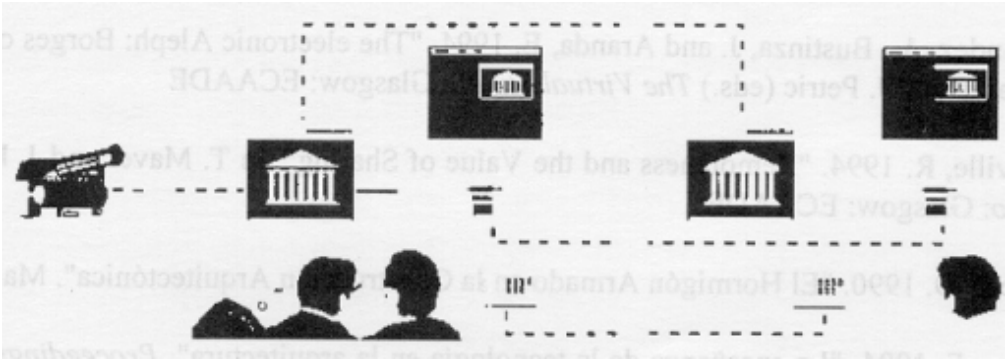


Fig. 5 - Hypermedia to support remote participation in site meetings (Source: BRICC)

Videoconferences, on line networked databases and other hypermedia materials would support lectures, discussion on design exercises, access to libraries' simulations of essays in virtual laboratories (Sanseverino 1994) and virtual walks on site.

Conclusions

Computers are one of the means that can help teachers in the achievement of our main goal: future architects' education. New information technologies are opening unsuspected routes for communication. Therefore the aim of this paper it is not discussing whether computers are an adequate tool in architectural conception or representation. We want to state that computers will be a useful mean of supporting new possibilities of communication, discussion remote participation and collaborative work of architectural education activities.
According to this, we think that the integration of information tools in all curricular subjects must be assumed by all academic staff. In our opinion this should be done since the very first year of the studies.

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