Teaching methods using the new technologies

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Abstract:

Since the primary education age the man knew through philosophy, a working tool for the resolution of these problems. The projection of technologies gave well thanks to the design, calculation, planning, the strategy of decision and the realization itself of the finished product. With the contribution of the cybernetic tools and automation allows us to define and build methodologies as powerful as possible of introduction and deepening of these new technologies.
In addition, the ageing of the programs and the teaching methods, the limitation of the level of the teacher and in consequence of the pupil and finally the limitations budgetary which reduce much and of advantage the level, it is high time to reflect to invent while taking as a starting point the other technologies for our own approaches.

In the process of reform which our country knows, one cannot hope to start the growth and to ensure the modernization of our company without the control of the factors which characterizes it, like science, technology, and the strategies of innovation and anticipation. This control as it is established of share the world, can be generated elsewhere only at the university, the organizations and associations which constitute a true reserve of know-how, scientific, and mean of communication competences.

Thus, to face an increased competition and to give the chance to take up the challenges of the expiry into 2002, technology has more than need to obtain strategy for performance which are based on the dissemination of informations within the university and best taken into account of the environment. The article presents various aspects and practical cases of teaching methodologies.

Key words: Pedagogy, training, artificial intelligence, intelligent tutor, new methodologies, educationnal sciences

I. Introduction :

The appearance of micro the computers in the years 1970 encouraged the researchers in data processing, being interested especially in education, to concentrate
of advantage on the new techniques of teaching which allow learning how to acquire new knowledge in conformity with their needs. These environments, which try to model the behavior of a teacher, are called: " *Intelligent Tutors* ".

They are software specialized in the teaching of a particular field, it comprise partially the capacities of a human teacher. However, this software is solidified and isolated. They cannot be configured for other fields, they thus do not support the reutilisability. The realization of such software remains an expensive operation. To cure these disadvantages, the Systems Authors were create.

They are systems conceived with an aim of discharging the author from the programming work to enable him to devote itself to the teaching contents of its software.
The objective of this article is to offer a whole of tools intended for the teachers to create achievable Intelligent Tutors systems.

The artificial intelligence is the sector of data processing havingmilked with the reasoning symbolic system and the resolution ofproblems. It differs from logic by the fact that it works on clausesand not on general theorems. It also differs from the digitaltechniques by its preoccupation with an explanation. For that, thefirst research tasks on this field led to a first operationalapplication " the Expert systems ", of which the only goal is to modelthe behavior of a human expert, achieving a intellectual task in aprecise field. These systems being containing knowledge, therepresentation of knowledge is one of their objective .

The systems design will be based on the concept of Directed Object, and in addition on the new technologies used for the software of teaching, such as Hypermédia, Multimédia... etc. The realization of the system passes by two stages:

· the environment author: In this stage, the author has the possibility of introducing the expertise on the field and the strategies teaching which it wishes to apply. He can also choose the technique of modeling of the pupil whom he wants to use to model learning them which interacts with its System Intelligent Tutor (STI).
The system also makes it possible to choose complementary teaching aids and modes of teaching and this with an aim of generating (STIs) flexible, convivial the and interactive ones.

· the platform tutor:
In this stage, the system manages the model of the pupil who allows the individualization of teaching by the taking into account of the profile of the pupil, and manages also the tutor who undertakes the analysis of the answers of the pupil and to decide forthcoming action to undertake. Lastly, it comprises an interface of dialogue with the pupil who is the component in charge of the exchanges with this one. This article is devoted to the Design and Réalisation of the System. In the design we detail the operation of the two levels of the system, by presenting their respective architectures and their components In the realization, we present the language with which we programmed, as well as the principal functionsused. In finality, we describe the software in general.

2. The representation of knowledge:

It is one of the major problems in I.A, for the success of an intelligent system depends on a good representation of knowledge. There are three models of representation: [1]

2.1 Representation:

it allows a description of knowledge without describing the way in which this knowledge will be used. One introduced the " declaratory diagram or " representation ", which is around mathematical logic. This diagram is described starting from symbolic systems objects, and it is exploited in the expert systems design and the development of the data-processing programs. Two types of logics were used to illustrate the type of declaratory diagram: - the logic of the proposals it rests on the proposal, which is a whole of words of the natural language :

- the calculation of the predicates it rests on the concept of variables and quantifiers.
- the rules of production they are one of the formalisms most used in " the Expert systems ". These rules translate knowledge in a simple and comprehensible formalism by the human expert.

2.2 Structured representation:

Semantic networks: this representation rests on a graph such as: - the nœuds symbolize the objects, concepts or events which one wants to represent - the arcs determine the type of relation which exists between them. The semantic network makes easy the deduction by transitivity, and this facilitates the realization of the inférences by heritage of properties, and thusthat avoids the repetitions. But this representation presents risks:
If the number of the nœuds and arcs is important, the combinative explosion can be essential.

- Frames: They are an extension of the semantic networks incorporating of procedural but noninférentielles knowledge. They were introduced as bases for the comprehension of complex behavior human (visual perception, natural language, etc
In this representation, an object contains attributes and each attribute contains facets.

- Attribute: name of the properties characterizing the object Facets. value of an attribute

3. Computer-assisted learning

3.1. Definition[2]:

According to the data-processing dictionaries, the Computer-assisted learning is the whole of the methods of use of the information processing systems like teaching aids integrated into the educational context, that it is in initial teaching (primary, secondary, higher) or in further education. The computer-assisted learning is thus the interactive use of the computer like teaching aid in the center of an educational relationbetween learning and teaching.

32. L' hypermedîa in the computer-assisted learning:

There are today applications which exploit the text, the sound, the fixed and animated digital image. The target of multi-media is the computer-assisted learning and the formation within the company. The development of an environment of training hypermédia allows learning how to explore a vast field of knowledge. The hypertexte defines the concepts as association of a natural language, with the possibility that has the computer to establish interactive connections and dynamic postings of a nonlinear text.

The idea of hypertexte is to carry out a base of data textual usable in an environment multi-user network making it possible to bind between them segments of files by cross references. The rules of the hypertexte are :

· possession of a broad corpus of information organized in many fragments.
· the fragments are connected the ones to the others.
· the user needs a small fraction each time.

The hypertexte can be compared to a base of data gathering several documents, but whose access would be done in any order, which gives a nonlinear sight to information.
The hypermédia is identical to the hypertexte except that it includes in addition to the text of the multi-media resource (image, its, video sequence...). It is a technique which integrates three separate technologies: the edition, data processing and broadcasting.

3.3 Structure of an hypertexte [3]:

A system hypertexte constitutes a network of ideas and differs from the base of data by the existence of active references, making jumps to change sight. The data are not stored linearly, but they are preserved in the form of separated recordings, and are read different courses. The originators are identified as authors, and the consultation is carried out by the readers. The structure is very complex, the system is thus composed of nœuds and bonds:

- Nodes: They are the containers of information of the image type, comment, its article.

- Bonds: It is a relation between nœuds making it possible to go towards another nœud, to show a reference, to supplement information, to post the index and to launch another program. .

3.4. Hypermédia in teaching [4]:

In education, the hypermédias and the hypertextes open new prospects. Just like the computer-assisted learning, they can support autonomous work, the individualization of teaching or the training at the rate/rhythm of each one. But the freedom of exploration that they offer to learning makes it possible to expect a revival of the teaching practices and the emergence of a new dynamics as regards education. In against part, this freedom can also generate confusion and éparpillement, and badly to lend itself to a control of learning.

4.Geometry tutor: [9]

It is TI(Tutor intelligent) intended to assist a pupil in situation of discovered and control of evidence in exercises of elementary geometry. Its interaction with the pupil rests on a dynamics in the evolution of the figures and the elements of evidence already established. Its architecture rests on the following one :

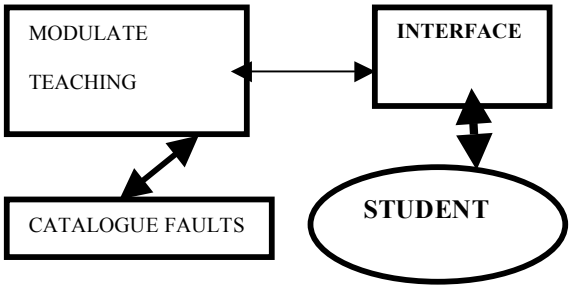

Figure 1. : Structure of the Tutor Intelligent

The student has the initiative. Its actions are compared with those of the expert: when they are different, the student is replaced on the way of the expert. The stress is laid on the erroneous rules. The creation of a teachware is far from being an easy company. The author must structure the matter to be taught to present it most clearly possible, and must envisage the interventions of learning how to answer it in a judicious way.

The major disadvantage of this technique is that the author of teachware must control the programming. This is why was created software of writing of teachwares, or " Systems Author " for the computer-assisted learning. This software discharges the author from the programming work itself, to enable him to better devote â the teaching structuring of its teachware.

5. Editor of examinations:

The author must introduce:

- the title of the examination which will be the file name which supports all information concerning the examination.
- the various exercises which the examination must comprise, in this case this editor calls upon the editor of the exercises (table.1):

Code	Name file	List exercises	scale
Exam 1		Exo 1/1 Exo 1/2 Exo 1/3	5 8 7
Exam 2		Exo2/1 Exo 2/2 Exo 2/3 Exo 2/4	4 6 7 3

Table.1

Codification :
the elements of the matter will be codified as follows :

Element of the matter	Code	Name file
cours	Cour i	
Exercise	Exo i*j	
Example	example k	
Exercise corrected	Exeo correctedl	
Exam	exam m (exo m*l, exo m*2, exom*3...)	

Table.2

6. Conclusion and Perspectives

For a few years already, the systems author have been conceived with an aim to program his software bearing on dwarf a private individual. The principal objective of this project is to d1offrir an Intelligent whole of tools authors for construction of Systems Tutors. design is based on the concept Orienté Object and multi-media technology. With this intention, the concept of reutilisability qu1offre this system motivated us much. We thus hoped to reach a certain degree of realization.

However, the realization of such a system is a rather complex task, it requires a considerable work. We could present the two stages of our system. Environment of construction of the Systems Intelligent Tutors.

The principal contribution of our work is the adaptation of the system author to the various curricular areas. present thesis allowed us to enrich our knowledge on the programmed learning as well as the flexibility by the hypertextes in the nonlinear presentation by the texts and integration by the sound and the image.
However, the system still opens ways in front of other improvements concerning:

· Addition of other teaching strategies.
· Enrichment of the module of explanation.
· Implementation of other techniques of modeling of the pupil such as the stochastic programming, the intelligent biological agents, the algorithms évolutionnaires and Co-évolutionnaires, neuro-fuzzy strategies.

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