Three stages for the scenarisation of leaning objects

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Abstract : The main focus of current discussions within the standardization process of Learning technology is on technical aspects of so called learning objects. The purpose of this paper is to show the three stages of a learning object scenarisation, starting with the instantiation of contents parameters. The second stage is related to the pedagogical instrument which represents the supports of these contents and finally the adaptation of a scenario for each pedagogical instrument.

1 Introduction

Current research in the field of teaching engineering [4], [5], [7] aims at concentrating on the learner's activity and hopes to be based on the scenario of training and to put it at the research center [8], [9]. Our goal is to propose a new formalism for didactic activity representation by using the approach "learning object" which is currently the subject of many work aiming to the standardization of their indexing [6],[10],[11]. Their goal has been to define open technical standards for computer supported learning environments and education products. The most important initiative of standardization are the Instructional Management Systems Project (IMS)[1], the Alliance of Remote Instructional Authoring and Distribution Networks for Europe (ARIADNE)[2], the Advanced Distributed Learning Initiative (ADL)[3] and (IEEE LTSC)[4].

2 Context of work:

Our work is within the framework AMICAL[5] project, a theoretical and development project of a multi-agents and knowledge-based computer for teaching and learning of reading. This project aims to the realization of multimedia intelligent tools likely to contribute the individualization of learning; it is related to the mother tongue (French) and addressed to children in normal schooling on their preparatory course. AMICAL is composed of three types of functional modules: the resource module, the exploration module and the tutorial module. The tutorial module, must lead, in a controlled way, to the acquisition of knowledge by the student to propose session of work. The sessions are the

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[1] http://www.imsproject.org
[2] http://www.ariadne-eu.org
[3] http://www.adlnet.org
[4] http://www.ieee.org
[5] Architecture Multi-agents Interactive Compagnon pour l'Apprentissage de la Lecture (an interactive learning- to-read environment with a multi-agent architecture)

result of a process, " didactic planing" [2], in which the system determines first an objective constructed from the knowledge it has about the student and the knowledge about the domain[3]. Then, the system determines a sequence of didactic activities with corresponds to this objective. The didactic activity types represents the property part of a learning object, it represents the content no instantiated yet. It's considered in this paper that the individualization of the learner's activity will be interpreted by the scenarisation of the learning object.

3 The three Stages for scenarisation of learning object

Learning objects are elements of a new type of computer-based instruction grounded in the object-oriented paradigm of computer science [6], [9], [10], [11]. This latter will be used to represent the didactic situation witch is considered as a multi-faces complex entity [1]. According to one of these faces, a didactic situation is a unit of action (it corresponds to the smallest one and at the same time to the isolable and the significant action which the system carries on for the objective fixed and attained by the student). Three stages of the scenarisation of a learning object will be specified in this paper. This scenarisation reveals the various aspects of didactic situation: - its content which represents the primary teaching matter, - its interface which is represented in the form of whole pedagogical instruments constituting the teaching equipment and finally - the scenario of use of each teaching instrument.

3.1 Construction of the pedagogical primary matter

The learning object is characterized, first of all, by knowledge bring into play for learning. Reusability, adaptation, and composition mechanisms are, therefore, employed to structure knowledge contents. This knowledge is represented in the form of entity < action, knowledge unit > or <Action; statute-of-learner's-knowledge; knowledge unit> such a knowledge units is regarded as parameters of contents individualization of learner's activity. The instantiation of this parameter represents the first stage for the scenarisation of the learning object. Our proposal lies in the use of the rational agent, which individualizes its parameters according to the student model while being based on rules (didactic, pedagogic and linguistic). If we want, for example, to instantiate the triplet < verify; Known; word-current >; we must replace the variable 'Word-Current' by a word 'M1' while basing our selves on words already known in the student model.

3.2 Specification of pedagogical material (determination of the pedagogical instruments)

The interfacing of the didactic activity relates to the adaptation of its interface to learner. It is a question of specifying the pedagogical instruments to be used for turn on the system's actions illustrated in the learning object properties. The determination of the pedagogical instrument is based on the knowledge first collected from the student model and those illustrated in learning object properties (its content).

An example of a pedagogical instrument is "the field of the text" that one regards as a support of these contents associated to its scenario of use. The pedagogical instrument is characterized by four criteria:

- Pedagogical Function: who can answer a pedagogical intention of type < action, knowledge unit > or <Action; statute-of-learner's-knowledge; knowledge unit>.
- Scenario of use: the duration of use, numbers tests and proposal help...

- Form: the shape of the instrument (Button; Text-Field; Word; letter, Image), colors, dimensions space...
- Contents : (the text, the word, the button name...)

3.3 Adaptation of the scenario of training:

It is possible, to reproduce at the same time complex models that one call "scenario of training" for a learning Object, using a significant number of types of declarative knowledge represented in the form of "properties", of procedural knowledge represented in the form of "methods". These methods are regarded as scripts describing the way of use of each pedagogical instrument. The scenarisation is done by the learning object scenarisation agent. It uses its base of knowledge built dynamically starting from the agents of the environment and the knowledge defined on the contents for scenarisation of each pedagogical instrument (find all suitable methods constituting the scenario of unfolding).

For example if we have the triplet manifested in proprieties of the activity "autonomous recognition words in text": < Observe; Known; current-word >. The agent use in first the student model to determine the suitable text and to instantiate current-words. In the second stage it make pedagogical instrument (field text) and button to validate the response. The agent choose the method observe_recognize (text, [word1,word2,word3…]) (among the various methods associated to this pedagogical instrument) to turn on the action Observe-recognize. Where [word1,word2,word3…] is the list of words instantiated in the first stage.
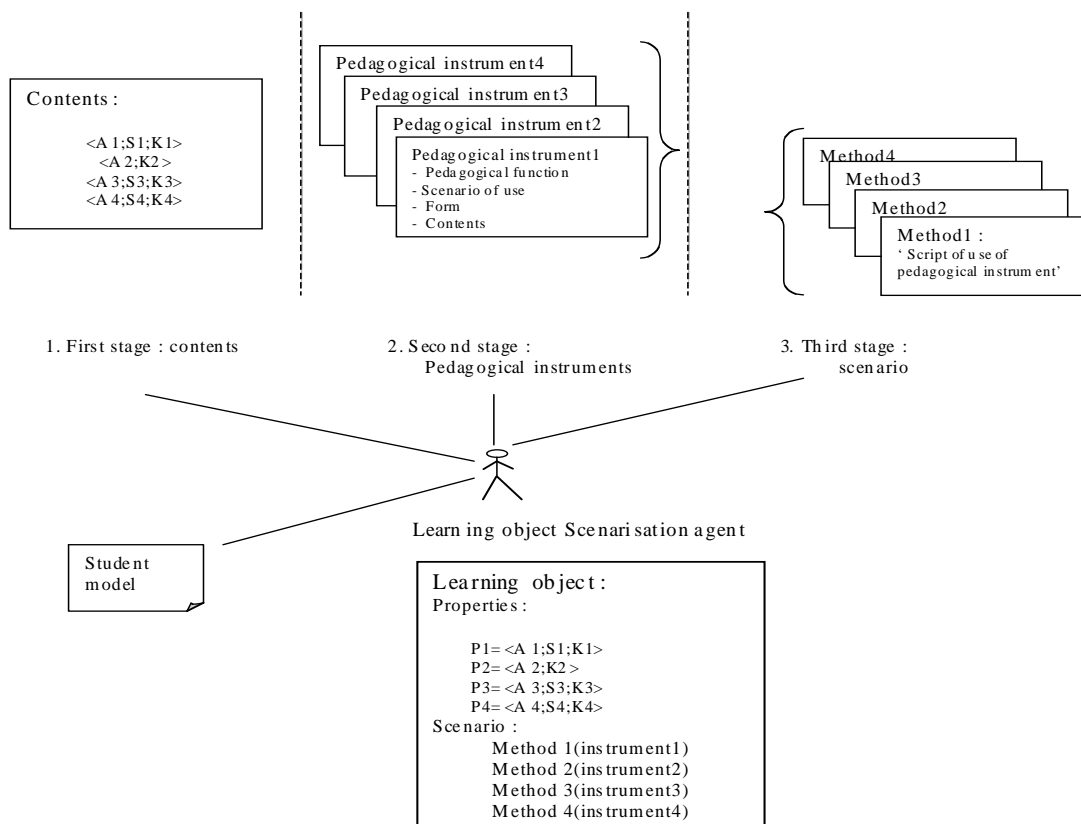

Figure 1 *Three stages for scenarisation of Learning Object*

4. Conclusion and prospects

We have presented a methodology for scenarisation of the learning object. The three stages of scenarisation have the potential to allow the simplified application of any instructional design theory to the learning object approach and provide a common ground for future research of the instructional technology called "learning objects" . This first work aims at defining the basic dimensions concerning the development of a didactic workshop dedicated to a dynamic management of the resources of training and tries to create a methodology of design based in learning object associated an agent witch has the role of scenarisation of this latter.

References :

[1] Bussapapach P. (2000). « Problem solving in a didactic situation in a computer assisted learning-to-read environment : Knowledge used by the student » , R. Nkambou (Ed.), ITS'2000 Young Researchers Track Proceedings, The Fifth International Conference on Intelligent Tutoring Systems, Montreal, Canada, Jun 2000, p. 46-50.

[2] Cherkaoui, C. et al. (1997) " Aspects de la planification didactique : étude dans le cadre d'un environnement d'aide à l'apprentissage de la lecture ", C. Cherkaoui, M. Chambreuil & L. Gaguet, *Sciences et Techniques Educatives*, vol. 4, n°3, 257-297

[3] Cleder C. (2002). Planification didactique et construction de l'objectif d'une session de travail individualisée : modélisation des connaissances et du raisonnement mis en jeu. PhD Thesis, University Clermont-Ferrand II December 2002, 250p.

[4] Dufresne A., Henri F. & Hotte R. (2002) A Methodological and Physical Instrumentation to Support Experimentation in Telelearning, Proceedings IFIP 17th World Computer Congress TelE-Learning the Challenge for the Third Millennium, Montréal, 289-296.

[5] Koper R. (2001) Modeling units of study from a pedagogical perspective - The pedagogical metamodel behind EML http://eml.ou.nl/introduction/articles.htm dernière consultation, (Consulted May 2005)

[6] Paquette G. (2004) Instructional engineering for learning objects repositories networks, 2nd International Conference on Computer Aided Learning in Engineering Education, pp 25-36, Grenoble, France, feb. 2004

[7] Paquette G. (2002). « Introduction » [online], *L'ingénierie du télé-apprentissage : pour construire l'apprentissage en réseaux*, Presses de l'Université du Québec. http://www.licef.teluq.uquebec.ca/gp/docs/pub/ ingenierie/introduction_livre_I.doc (Consulted may 2005)

[8] Pernin J-P. & Lejeune A. (2004) Scénarios d'apprentissage : quelles stratégies de réutilisation pour les enseignants, colloque TICE Méditérranée, Nice, november 2004.

[9] Pernin J-P. & Lejeune A. (2004) Dispositifs d'apprentissage instrumentes par les technologies : vers une ingénierie centrée sur les scénarios, colloque TICE 2004, Compiègne, octobre 2004. Pernin J-P. & Lejeune A. (2004) Nouveaux dispositifs instrumentés et mutations du métier de l'enseignant, 7 ème biennale de l'Education, Lyon, april 2004.

[10] Pernin J.-P. (2003) Objets pédagogiques : unités d'apprentissage, activités ou ressources ? Revue Sciences et Techniques Educatives, Hors série 2003 "Ressources numériques, XML et éducation", 179-210, april 2003. Editions Hermès.

[11] Wiley, David A. (2002): Connecting Learning Objects to Instructional Design Theory: A Definition, a Metaphor, and a Taxonomy. In: David A. Wiley (Ed.): The Instructional Use of Learning Objects. Agency for Instructional Technology and Association for Educational Communications & Technology, Bloomington, Indiana, pp. 3-23.