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Documentaries use for the design of learning activities

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Abstract: *Documentaries used in the training field constitute the rich sources of information. They have the advantage to associate the elements of knowledge with events which request the episodic memory of the learner.Thus, these documentaries increase the probability of retention of knowledge they convey. However, the logical sequence of knowledge does not guarantee an efficient construction which can be mobilized in situations of action. In this paper, we seek how to benefit from the potential of these documentaries to promote the construction and mobilization of knowledge by the learner in an elearning platform. Particularly, we propose a method allowing segmenting the contents of a documentary to design learning activities. Based on a case study related to the field of mechatronics, we begin by segmenting the content of a documentary in terms of elements of knowledge (facts, concepts, procedures, and rules) then we connect with each of these problems they seek to find answers. We reorganize learning activities to promote the acquisition and mobilization of knowledge by the learner. We conclude by proposing a pedagogical scenario to implement these activities in elearning platform.*
Keywords: *LMS, IMS-LD, Documentary, Design, Elearning*

I. INTRODUCTION

In the educational environment, the use of audiovisual dates back several years and it relies on several models ranging from simple teaching aids to the interactive learning environments. This use covers several fields, which physics (Constantinou and Papadouris, 2004), mathematics (Blisset and Atkins, 1993), sports (Guadagnoli, Holcomb and Davis, 2002; Horn, Williams and Scott, 2002), health care (Hill, Hooper and Wahl, 2000), and therapeutic counseling (Urdang, 1999).

Hereinafter, we consider a video documentary or one of these parts as a digital resource that we seek to exploit to design learning activities to be distributed either locally or via the web. We seek to operate more accurately the power of video documentaries to be exploited in face mode for designing learning activities.

II. THE KNOWLEDGE CONVEYED BY A DOCUMENTARY

In the most diverse training fields, documentaries are used to convey face mode that can be used for many purposes contents:

- help building a new knowledge
- help consolidating an acquired knowledge
- overcome the constraints related to the acquisition of a type of knowledge
- etc.

Generally, the conveyed content by such a support are implicit and they can not be used by the learner as such after having been explained. The explanation is the result of an operation of expert interpretation which depends heavily on the context in which it was held.

III. EXTENDING THE CONTENT OF A DOCUMENT

The explanation content we just mentioned is not sufficient to facilitate educational use, we must complete it by action annotation which enriches the different contents by the addition of supplementary information.

In this sense, an annotation is a generic term which includes both adding an unconstrained information that adding a well-trained information called metadata

Among the diversity of metadata standards that describe digital resources, there is the standard "Learning Object Metadata (LOM)", which is oriented towards the description of resources for educational purposes.

The conceptual model of the LOM metadata standard is divided into nine categories, each doing a clearly defined function (General, Lifecycle, Meta-metadata, Technical, Educational, Rights, Relation, Comment, and Classification). Each category contains a number of description elements.

In the study case we present below, we especially insist on the "proposed use" of the "teaching" element to facilitate the different fragments use of the instructional designer scenario

IV. CASE STUDY: SEGMENTATION OF A DOCUMENTARY CONTENT

In this case study, we focus on the fragmentation of a video documentary about a mecha-tronic taught as a subject at the cycle "Engineer". This is actually a free video broadcast on youtube and adopted by the department of mechanical FST Settat city to introduce the basic knowledge about mecha-tronics a group of 30 engineering students pursuing their education in the fourth grade "industrial engineering".

The 40 min 53 sec video describes a traditional approach to achieve a quadrotor (a machine whose engine part consists of four rotating propellers connected to four rotors). In quadrirotor subject of the video, the narrator distinguishes the following four subsystems:

- Power
- Electronic hardware - The control part
- Mechanical hardware
- The software

Our segmentation method touches these four sub-systems and is based primarily on the isolation elements having a content items which presents a semantic consistency and whose intention of the narrator keeps stability.

We consider any sequence that conveys segment content with a coherent educational performance (relative to the curriculum in question) and that keeps steady pedagogical intention underlying the sequence. We then associate with each segment for it purports to convey and a proposal for an educational use.

We used the free software EKD which allows for treatments (including segmentation) post-production on a video and / or a sequence of its segments.

Segment	What it purports to convey	Can be used for
S1	Calculators and sensors presentation (accelerometer, Gyrometers, GPS, Rangefinders, Barometric Magnetometer)	Introduce : • the sensor concept and its various types • the control concept in an automated system
S2	Quadrirotor behavior simulation with sensors	Introduce : • system behavior simulation • correction
S3	The mechanical structure conception with AutoCad	Introduce : • functional analysis • Mechanical structure conception of an automated system
S4	Sizing uadrirotor	Introduce : • System sizing • The use of knowledge bases for sizing a system.
S5	Components choice	Introduce the concepts of: • engine • control
S6	Setting and testing	Introduce the concepts of: • fixing • protection • test

TAB 1 - Table summarizing the segmentation method on our study's document object

Analysis of the various elements associated with each of the mentioned segments allowed us to identify relevant knowledge that we have grouped by the type of D. Marril

	Fait	Concept	Principe	Procédure
Quadrirotor	✓			
Quadrirotor modelling			✓	
The automated system (SA)		✓		
Control in SA		✓		
Simulating the behavior of a SA		✓		✓
The correction in SA		✓		✓
The mechanical conception		✓		
Sizing				✓
Engine		✓		✓
Fixing		✓		✓
Protection		✓		✓
SA control		✓		✓
Model test		✓		✓

TAB 2 - Grouped knowledge according to D. Merrill typology

In the following, we will refer to TAB 2 and try to conceive a focus learning system on an approach by problems which allows us to develop among learners the knowledge herein. We particularly seek educational pretexts that allow us to deal with all relating issues:

- to the modeling of an automated system
- to the control in an automated system

- to the simulate of an automated system behavior
- to the translation of the an automated functional structure system
- to the mechanical conception of an automated system
- to the manufacture of an automated mechanical system
- to the programmed control of an automated system
- to the model test of an automated system.

Activities	Activity title	Problem(s) in which the activity responds
A1	Modeling of an automated system	P1: How to develop models (schematic and formal) that describe the behavior of an automated system. P2: How to determine the main factors DEPOND the behavior of an automated system.
A2	Control in an automated system	P3: How to set up a system to control the behavior of an automated system.
A3	Behavior simulating of an automated system	P4: How to simulate the behavior of an automated system. P5: How to set up a system of correction.
A4	The functional structure definition of an automated system	P6: How to determine the overall structure of an automated system. P7: How to define the functional structure of an automated system.
A5	The mechanical conception of an automated system	P8: How to define the mechanical architecture of an automated system. P9: How to design the mechanical components of this architecture: • Engine • Setting • Transmission • Protection.
A6	The manufacture of an automated mechanical system	P10: How choir materials P11: How to choose the machine tools P12: How to define the machining processes.
A7	The programmed control of an automated system	P 13: How to program the control part of an automated system. P14: Understanding the interactions between the sensors and actuators of an automated system.
A8	Model test of an automated system	P15: How to test the actual operation of an automated system. P16: Check the assumptions on the behavior of an automated system.

TAB 3 - Table showing the selected activities for our learning system.

V. LEARNING ACTIVITIES SCRIPTING

To describe the effective sequence of the various selected activities for our learning system, we use the educational modeling language initiated by Kopper and adopted by IMS as a specification called IMS LD (Instructional Management System Learning Design). Indeed, Koper (2001) proposes to describe the learning units using modeling languages teaching that define the relationships between:

- the knowledge or skills goals
- actors learning
- the activities carried out
- environment and necessary content to the establishment of the learning situation

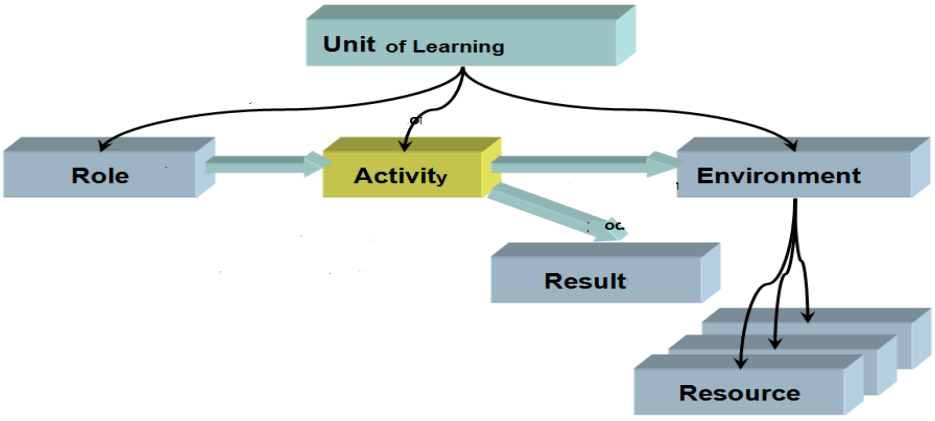

FIG. 1 - Architecture of a learning unit according to Rob Koper.

Since then, several studies have succeeded and they all aim to make it easier for designers of learning systems while respecting the IMS LD specification.

We choose for this paper, the Pernin approach (2004) which aims to describe a learning unit for scenario which is nothing other than a description, made a priori the sequence of a learning unit aimed at the acquisition of a body of knowledge, specifying the roles, activities and resources for handling knowledge, tools, and necessary services for the implement activities.

To which we add an input by problems entry problems which the learning activities are trying to find response elements.

	Activities	Roles			Environment		
		Tutor	Learner	Group	Ressources	Service	Tools
P1, P2	A1	✓		✓	The whole video	Chat forum	Mapping software Computer Algebra
P3	A2	✓		✓	Web page around S1	Chat forum	
P4, P5	A3	✓		✓	web page aoundS2	Chat Forum	Behavior simulation software
P6, P7	A4	✓		✓	Web page around S3	Chat forum	Modeling software functional
P8, P9	A5	✓		✓	Web page around S3 and S4	Chat forum	Logiciel de CAO
P10, P11, P12	A6	✓	✓		Web page around S4	Forum	Logiciel de FAO
P13, P14	A7	✓		✓	Web page around S5	Forum	Kit de développement
P15, P16	A8	✓	✓		Web page around S6	Forum	Portfolio

TAB 4 – Retained scenario for our case.

VI. CONCLUSION

Although we applied this method in video documentaries for use in the field of training, it can be applied to other media resources (animation, sound files, images ...)

The transition of media resources use in face mode to a focus on distance learning use, requires a disciplined approach allowing help to the designer to:

- extract educational pretenses
- choose a pedagogical approach that determines the entries for educational pretenses
- script learning activities around the entrances and environments offered by distance learning platforms.

This work presents an attempt in this direction and we are experimentally validate to draw results will be other publications.

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