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# Collaborative e-learning display for acquiring professional skills

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This contribution states with designing collaborative tools for acquiring professional skills. A distanced e-learning display has been designed with international partners to teach computer graphics sciences in a master degree. The display is named VCIEL for On Line Visualization and Designing in Computer. Students might come and live in every country of the world. One of the goals is to allow students to integrate professional know-how with the aim of finding an employment after graduation. Regarding computer supported collaborative work, cognitive sciences and ergonomics researches, the pedagogical e-learning-project team chose to design an external representation with several functionalities. Two tools were thought to support student-tutors-companies collaborative activities in the whole task of managing project while being tutored and evaluated. The chosen open source platform is SPIRAL. Design has been made following ergonomical methodology testing subjects-future learners and tutors on displays relevance.

**Keywords** e-learning; platform; collaborative tools; ergonomics.

## 1. Context

The professionalisation is an important objective of our university formations: it asks the student to acquire specific skills, know-how related to a field and transmitted by experts. For that, many teaching devices propose to the students to carry out internships in company or to work on case studies. Our study is centered on how formations may professionalize remote students. The field we focus on is a distributed e-learning display. It has been designed with international partners (Switzerland, France, Tunisia and Algeria) to teach computer graphics sciences in a Master degree. The display is named VCIEL for On Line Visualization and Designing in Computer Graphics (in French, Visualisation et Conception Infographiques En Ligne) [1]. One professional skill that is considered as major is managing projects. The paper aims to present how the project-team designed tools to support the pedagogical goals – acquiring skills for managing projects- in this context.

Understand project management skill asks for the integration of a great diversity of parameters. Theoretical knowledge can be taught but there is not an ideal organization: only choices adapted to a specific context, a situation and an objective. The students must thus practice the project management to assimilate know-how and to be effective the day when they will find an employment.

In the followings paragraphs we explain the pedagogical display we chose to enhance these skills and we expose the tools we designed to help actors in VCIEL e-learning device.

## 2. Pedagogical display

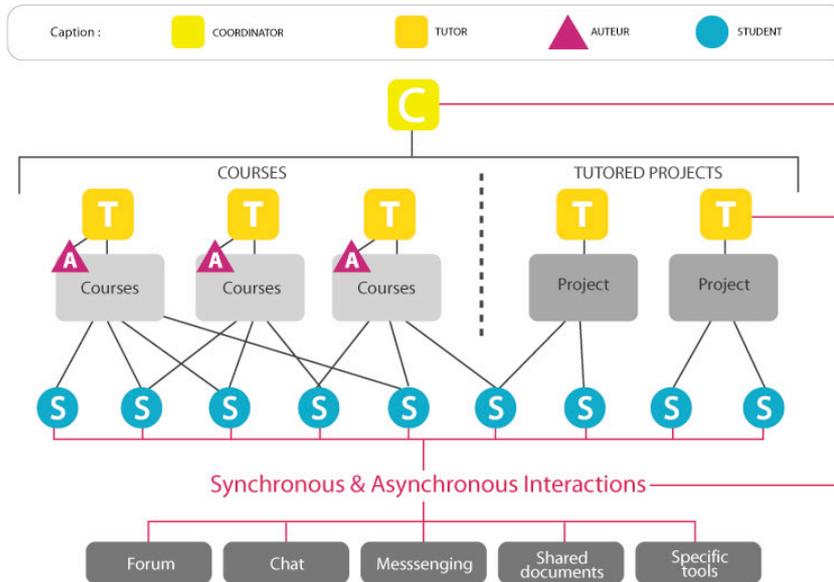
In the VCIEL device students might come and live in every country of the world; most of them are living in Africa. Professional and university teachers in partners' countries provide tutoring. One of the goals is to allow students to integrate professional know-how with the aim of finding an employment after graduation. For it the students have first to realize an internship in the field and secondly work on distance in team to answer real computer graphics project resulting from companies.

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Thus, the pedagogical team has thought in term of scenarization of the current courses [2]. To do so, our designed team developed several courses (Fig. 1). Some of them involve the design of a pedagogical multimedia object by an author (A), followed by students (S) with the help of specialized tutors (T) (see left part of Fig. 1). The others courses are designed to allow students managing real project in working teams. (see right part of Fig. 1).

Our study focuses on the “Managing Projects” course and the designed tools for answering the special needs this course demands.



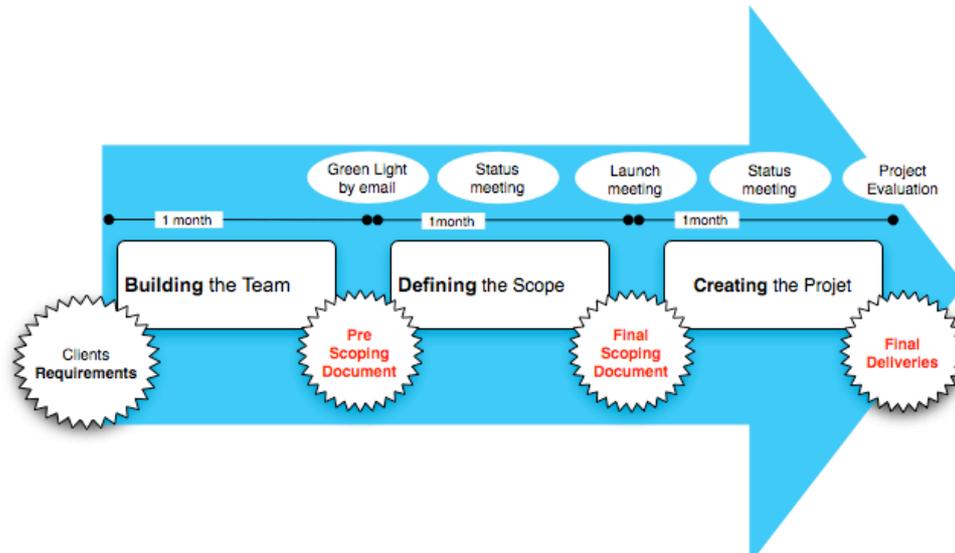
**Fig. 1** Pedagogical model in VCIEL Campus.

### 3. The online “Managing Project” course

The pedagogical frame is shown in Figure 2. First, project teams may be constituted, and validated by assigned tutors. Hence, teams work on projects: they first think about the design then carry out the product they are involved in.

Currently, in our situation of study, the teams are made up of two or three students. The validation of the stage is carried out by the tutor with the electronic reception of a pre-scoping document (summarized project including/understanding the actors, partner, production line team, nature, the objective and the target of the product). The choice of the team-mate depends on a multitude of criteria: interest of the project, skills required by the project. Affinity criteria, the representation of the other’s skills are related to reciprocal confidence. These two types of criteria are taken into account in the realization of the interface.

The next paragraph presents those tools: the process of design and the functionalities.



**Fig 2** Pedagogical frame for the “Managing Project” course in VCIEL device.

#### 4. Designed environment

Regarding computer supported collaborative work, cognitive sciences and ergonomics researches, the pedagogical e-learning-project team chose to design an external representation with several functionalities. Indeed, a lot of studies have dealt with the impact of the used tools (chat, forums or shared displays ...) on people interactions and solving complex problems (i.e. designing tasks). The chosen open source platform – SPIRAL designed by University of Lyon [3] – provides some of those collaborative tools. In partnership with the platform design team, we added two tools: one for building students teams and the other, more basic, to support managing projects. Design has been made following ergonomical methodology (user centered design), testing subjects-future learners and tutors on displays relevance.

##### 5.1 Building teams

The first tool concerns the team building stage. Students can post a company proposal; propose the offer to their student colleagues, fill a form with their profile, their skills, the procedures and knowledge they want to learn ... Tutors can evaluate the relevance of the propositions, the established teams (complementarity in the skills members), accept or refuse the student proposals...

In optics to adapt the interface to the users, and the ergonomic criteria of design of interfaces [4], the stress was laid on the activities of the tutor and the students: choice of a project and a partner by the students and validation of the project and the team by the tutor.

A preliminary study carried out on three binomials of students working remotely on the needs related to the multimedia project control [5] made it possible to identify the important characteristics of a project, for the students and the tutor. The developed interface proposes to the students to choose a project according to these characteristics: required competences, duration, sleeping partner, remuneration... In this case, it is assigned to one or more project in the list, the tutor validates then this choice (Fig. 3). The student can also propose a project using the tool, it is then validated by the tutor.

Project	State	Assignments
<a href="#">Educational Game about sound: CDROM</a>	<a href="#">On standby of validation</a>	<a href="#">Assignments</a>
<a href="#">Hotel de France: Web site redesigning</a>	<a href="#">On standby of validation</a>	<a href="#">Assignments</a>
<a href="#">Electronic music band: graphic design</a>	<a href="#">Approved</a>	<a href="#">Assignments(1)</a>
<a href="#">Web developpement for a search tool</a>	<a href="#">Approved</a>	<a href="#">Assignments(2)</a>
<a href="#">E-learning content management system dev</a>	<a href="#">Approved</a>	<a href="#">Assignments</a>
<a href="#">Galerie Lafayette, illustrations and flash</a>	<a href="#">Locked</a>	<a href="#">Assignments</a>
<a href="#">Videogames 3D animations</a>	<a href="#">Locked</a>	<a href="#">Assignments</a>
<a href="#">Mairie de Lyon: accessibility, web dev...</a>	<a href="#">Rejected</a>	
<a href="#">Photo gallery in Flash</a>	<a href="#">Removed</a>	

**Fig 3** Screen for Tutors and Students: project list with state (assignments and validations).

Remotely, the students do not know themselves, never had to work together. It is thus difficult to fill the criterion of mutual confidence [6]. To face this major difficulty, the students can present themselves thanks to an electronic personal page. To homogenize information, the tool requires competences of them which they consider to have, their level but also those to which they wish to be formed (Fig. 4).

<b>Project Management</b>		
<input type="checkbox"/> MS Project	<input type="checkbox"/> User centered Design	<input type="checkbox"/> Gant
Other Skill	<input type="text"/>	
<b>Graphic Design</b>		
<input type="checkbox"/> Flash	<input type="checkbox"/> Director	<input type="checkbox"/> Photoshop
Other Skill	3DsMax <input type="text"/>	
<b>Languages</b>		
<input type="checkbox"/> PHP	<input type="checkbox"/> ASP	<input type="checkbox"/> Java
<input type="checkbox"/> C/C++		
Other Skill	<input type="text"/>	
<input type="button" value="Submit"/> <input type="button" value="Reset"/>		

**Fig 4** Screen editing students personal skills.

The team can thus constitute itself: starting from the list of the projects integrating competences necessary to their realization, the students can determine if their competences correspond to the requirements. If a student is already assign to the project, another student can consult his profile and affect himself to supplement the team (Fig. 5).

The tutor can submit projects, judge relevance of projects suggested by learning, the teachers or an external sleeping partner. The decision to validate a project, to refuse it or to modify it returns to him. The interface enables him to justify this choice if that is necessary. Communication tools (forum, chat) are placed at their disposal to facilitate the interaction and collaboration. The interface also makes it possible to follow the projection of the process of constitution of the teams, by presenting the list of the students with their requests (Fig. 5) and the requests by project.

## 5.2 Managing projet

The second tool in VCIEL device allows conducting managing project from student with tutoring and openings to companies. Students may share applications, documents with tutors, companies or only with the student team. They also can chat, interact together with specifics rights. It follows the functionalities needed by this type of activity. Moreover, analysis of persons activity might be done with recorded information such as : chat interactions, shared documents, forums, time logins and out ...

Project :	Le gîte "Les Issards"		
Required Skills	ASP,	Flash,	Photoshop,

Appointed Students list

Student	Skills	Evaluation by tutor
Carline SIMO	<a href="#">Profile</a>	😊😊😊 <input type="button" value="Add"/>
Carline Gustave	<a href="#">Profile</a>	😊😊😊 <input type="button" value="Add"/>

Add a student from the global registered students list

<p>Registered Students</p> <ul style="list-style-type: none"> <li>Sandra BOUZDI</li> <li style="background-color: #e0e0e0;">Thachakrit SON</li> <li>Tarikra MERET</li> <li>L Hadi BERT</li> <li>Tarik PAUBER</li> </ul>	<input type="button" value="&gt;&gt;"/>  <input type="button" value="&lt;&lt;"/>	<p style="text-align: right; color: blue;">Add</p> <div style="border: 1px solid gray; padding: 2px;">Jérémy ASAC</div>
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**Fig 5** Screen for the tutor: projects assignments with global interface of the situation.

## 5. Perspectives

This study has presented two tools that may support a pedagogical frame with acquiring professionals skills objectives. They have been implemented in the platform SPIRAL and tested on several students in controlled contexts. VCIEL device will use them soon. The design team will then analyze students, tutors and client activity and provide modifications if necessary.

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