

# **Technical Proposal. Roadmap 2012:**

## **Development and maintenance of eXe Learning**

**Prepared and revised by:**

**Ismail Ali Gago, Head of e-Learning and Web Contents Area, Institute of Educational Technologies, Ministry of Education.**

**Antonio Monje Fernández, Director of the National Center for Curriculum Development in Non-Proprietary Systems.**

**Pedro Peña Pérez, Technical Director of Open Phoenix IT.**

**Alejandro Díaz López, Responsible for Client Relationship Management of Open Phoenix IT.**

**Translated into English by: Suzana Rukavina, a Phd candidate from the University of Zagreb, a work placement programme student at ITE.**

## Table of contents

<b>Introduction.....</b>	<b>4</b>
<b>Conventions and protocols.....</b>	<b>5</b>
<b>Phase 1:.....</b>	<b>6</b>
<b>Definition of processes.....</b>	<b>6</b>
<b>Interface compatible with other browsers.....</b>	<b>6</b>
<b>Work plan.....</b>	<b>7</b>
<b>Phase 2:.....</b>	<b>8</b>
<b>Definition of processes.....</b>	<b>8</b>
<b>Compatibility with Twisted 10.x and Nevow 0.10.....</b>	<b>8</b>
<b>Actualization of TinyMCE.....</b>	<b>8</b>
<b>Dependency on system libraries.....</b>	<b>8</b>
<b>Video and audio support through HTML5.....</b>	<b>9</b>
<b>Work Plan.....</b>	<b>10</b>
<b>Phase 3:.....</b>	<b>11</b>
<b>Definition of processes.....</b>	<b>11</b>
<b>Improvements of HTML importer.....</b>	<b>11</b>
<b>Revision of iDevices.....</b>	<b>11</b>
<b>Mechanisms for adding iDevices.....</b>	<b>11</b>
<b>Graphic generator of styles.....</b>	<b>12</b>
<b>Inclusion of mathematics editor.....</b>	<b>12</b>
<b>Work plan.....</b>	<b>13</b>
<b>Services budget.....</b>	<b>14</b>

<http://www.ite.educacion.es>  
<http://cedec.ite.educacion.es/>

<http://www.open-phoenix.com/>

## Introduction

The aim of this proposal is to present technical foundations based on which eXelearning application development and maintenance project is to be carried out in three phases.

In a global perspective, the technical goal of this project is to undertake the maintenance of eXeLearning software, upgrading the current components to higher versions and adding new ones to meet new necessities as requested by the community of users.

The development of this functionality presents a series of challenges based on which we describe proposed solutions in the current document as well as additional risks that are present in the development.

This document is to be considered as a declaration of intentions from the technical point of view and not as a document of the final design since the mentioned final design will be carried out during the beginning of the project.

## Conventions and protocols

After previous studies and various reunions held in person between:

- Ismail Ali Gago on behalf of the Institute of Educational Technologies (ITE <http://www.ite.educacion.es>), Spanish Ministry of Education.
- Antonio Monje Fernández on the part of the National Center for Curriculum Development in Non-Proprietary Systems (CEDEC <http://cedec.ite.educacion.es>), Spanish Ministry of Education.
- Clara Sanz, from Dirección General de Formación Profesional, responsible for Distance Vocational Education, with his working group, (<http://www.educacion.gob.es/fponline/>) Spanish Ministry of Education
- José Miguel Andonegi from Instituto de Formación Profesional a Distancia (ULHI <http://www.ulhi.hezkuntza.net/web/quest/inicio1>), Departamento de Educación, Universidades e Investigación, Basque Government.
- and Pedro Peña as the agent of Open Phoenix IT S. Coop., it was decided to divide the development and maintenance of the application in different components or processes which could be optionally undertaken separately or in various phases provided that there are no dependencies between them.
- And under Antonio Pérez Sanz's supervision, Director of the Institute of Educational Technologies (ITE <http://www.ite.educacion.es>), Spanish Ministry of Education.

It has been decided to divide the development and maintenance of the application into different components or processes that can undertake alone or in phases as long as there are no dependencies between them.

There will be established various classifications of the application upgrading processes depending on various factors: if the involved component belongs or not currently to the application or if we are talking about a structural or peripheral component.

## Phase 1:

### Definition of processes

Below we are providing a description of the processes which are to be developed in order to bring the project to successful conclusion.

#### Interface compatible with other browsers

<b>Procedure</b>	<b>Development of the web HTML interface + Javascript in order to replace XUL interface</b>	<b>POP01</b>
<b>Developer</b>	Open-Phoenix IT	
<b>License</b>	GPL 3.0 (open source)	
<b>Modification</b>	Structural	
<b>Component</b>	New	
<b>Description</b>	<p>There is to be developed a web interface, identical with <a href="#">ExtJS</a> in order to make the interface compatible with the majority of browsers (<a href="#">ExtJS compatibility in the section Browser Compatibility</a>). It will replace the current web interface based on XUL and dependent on Firefox browser.</p> <p>There will also be undertaken necessary changes in this process in order to make eXe a pure web application and therefore it could be executed from a remote server.</p> <p>In order to make sure that the interface provides the same functionality, a battery of tests covering the entire functionality of the current interface will be developed. The said battery will be transferred to a new interface executed from a remote server, maintaining the same results as with the original interface.</p>	
<b>Dependencies</b>	None	

## Work plan

<b>Discovery</b>		
"To obtain a clear picture of the physical infrastructure, design and current structure and the operations surrounding it, as well as to carry out all the previous tasks of defining and provisioning of necessary equipment to complete the project. The Design Document can be submitted in this phase."		
Discovery	A day divided into various activities during the first phase of the project during which specific information is collected necessary for the elaboration of the design document.	<ul style="list-style-type: none"> <li>Screening of the processes to be developed.</li> </ul>
Design Documentation	Elaboration of the design document specifying all the technical details necessary to develop the project.	<ul style="list-style-type: none"> <li>Revision of the screened information</li> <li>Document writing.</li> </ul>
<b>Preparation</b>		
"To ensure the environment for development based on which is to be carried out the plan in accordance with the design document."		
Systems	Installation and configuration of different operating systems.	<ul style="list-style-type: none"> <li>Installation and configuration of operating systems.</li> <li>Environment preparation in order to automate joint and functional tests.</li> </ul>
<b>Development</b>		
"To undertake the project goals through components development."		
Interface compatible with other browsers	Development of the HTML web interface + Javascript in order to replace XUL interface	<ul style="list-style-type: none"> <li>Design and implementation of the interface under ExtJS</li> <li>Changes in eXe in order to work from a remote server</li> </ul>
<b>Testing</b>		
"To perform tests against the full platform using as a guide the design document and success criteria."		
Testing	Carrying out tests established in the design document.	<ul style="list-style-type: none"> <li>Transfer functional tests to the full application.</li> </ul>
<b>Total invoicable: €14,336.00 + VAT / €16,916.48 VAT included</b>		

The beginning of the project could be starting from 16th January 2012, the estimated duration of the project being 11 weeks. Therefore, the submission date would be 30th March 2012.

## Phase 2:

### Definition of processes

Below we are providing a description of the processes which are to be developed in order to bring the project to successful conclusion.

#### Compatibility with Twisted 10.x and Nevow 0.10

<b>Procedure</b>	<b>Upgrading eXe's source code in order to be able to use Twisted 10.x and Nevow 0.10</b>	<b>POP01</b>
<b>Developer</b>	Open-Phoenix IT	
<b>License</b>	GPL 3.0 (open source)	
<b>Modification</b>	Structural	
<b>Component</b>	Current	
<b>Description</b>	<p>All method and function calls carried out from eXe to Twisted and Nevow are to be upgraded in order to meet the modifications in methods and functions interfaces introduced from current versions of libraries to target versions.</p> <p>In order to ensure success of the process, a battery of joint tests which cover 100% of the methods and functions source code which call libraries in their current version will be elaborated. Afterwards, the battery will be run through the modified source code using the new versions of libraries until the test results are identical with the initial ones, making sure that upgrading does not alter the original performance of eXe's methods and functions.</p>	
<b>Dependencies</b>	POP03	

#### Upgrading of TinyMCE

<b>Procedure</b>	<b>Upgrading eXe's source code in order to be able to use TinyMCE 3.x</b>	<b>POP02</b>
<b>Developer</b>	Open-Phoenix IT	
<b>License</b>	GPL 3.0 (open source)	
<b>Modification</b>	Structural	
<b>Component</b>	Actual	
<b>Description</b>	<p>The source code of eXe will be upgrade in order to use TinyMCE 3.x. The necessary issues will be verified and upgraded so that HTML code generated by TinyMCE 3.x does not alter eXe's functionality.</p>	
<b>Dependencies</b>	POP03	

## Dependency on system libraries

<b>Procedure</b>	<b>Upgrading the source code and installers generators in order to depend on operating system libraries and components.</b>	<b>POP03</b>
<b>Developer</b>	Open-Phoenix IT	
<b>License</b>	GPL 3.0 (open source)	
<b>Modification</b>	Structural	
<b>Component</b>	Current	
<b>Description</b>	<p>eXe's source code will be upgraded in order to use the libraries and components installed in the operating system instead of using them directly. Among the libraries and elements to be relocated are the following: Twisted, Nevow, TinyMCE, GeoGebra, Universal Feed Parser and Beautiful Soup.</p> <p>In the same manner, the script generators of binary installers will be upgraded in order to contain the installation of necessary libraries, not included in eXe itself, in the operating system.</p>	
<b>Dependencies</b>	POP01, POP02	

## Audio and video support through HTML5

<b>Procedure</b>	<b>Upgrading eX's source code in order to include embedded video and audio support using HTML5 code.</b>	<b>POP04</b>
<b>Developer</b>	Open-Phoenix IT	
<b>License</b>	GPL 3.0 (open source)	
<b>Modification</b>	Peripheral	
<b>Component</b>	New	
<b>Description</b>	<p>eXe's source code will be upgraded in order to include embedded audio and video support using HTML5 code instead of Flash in browsers which support the necessary components of HTML5 standard.</p> <p>In case the browser cannot display audio or video using HTML5 code, it will be displayed using Flash in the way it is done in the current version.</p>	
<b>Dependencies</b>	None	

## Work plan

<b>Discovery</b>		
"To obtain a clear picture of the physical infrastructure, design and current structure and the operations surrounding it, as well as to carry out all the previous tasks of defining and provisioning of necessary equipment to complete the project. The Design Document can be submitted in this phase."		
Discovery	A day divided in various activities during the first phase of the project during which specific information is collected necessary for the elaboration of the design document.	<ul style="list-style-type: none"> <li>Screening of the processes to be developed.</li> </ul>
Design Documentation	Elaboration of the design document specifying all the technical details necessary to develop the project.	<ul style="list-style-type: none"> <li>Revision of the screened information</li> <li>Document writing.</li> </ul>
<b>Preparation</b>		
"To ensure the environment for development based on which is to be carried out the plan in accordance with the design document."		
Systems	Installation and configuration of different operating systems.	<ul style="list-style-type: none"> <li>Installation and configuration of operating systems.</li> <li>Environment preparation in order to automate joint and functional tests.</li> </ul>
<b>Development</b>		
"To undertake the project goals through components development."		
Compatibility with Twisted 10.x and Nevow 0.10	Upgrading eXe's source code in order to be able to use Twisted 10.x and Nevow 0.10	<ul style="list-style-type: none"> <li>Elaboration of a joint tests battery</li> <li>Upgrading the source code until the joint tests are run through correctly.</li> </ul>
Upgrading of TinyMCE	Upgrading of eXe's source code in order to be able to use TinyMCE 3.x	<ul style="list-style-type: none"> <li>Upgrading eXe's source code</li> <li>Tests, verifications and modifications necessary in order to make sure that the same functionality as with the previous version is maintained.</li> </ul>
Dependency on the system's libraries	Upgrading of the source code and installers generators in order to depend on operating system's libraries and components.	<ul style="list-style-type: none"> <li>Upgrading of eXe's source code</li> <li>Upgrading of installers scripts generators</li> </ul>
Audio and video support through HTML5	Upgrading of eXe's source code in order to include the embedded audio and video support using HTML5 code.	<ul style="list-style-type: none"> <li>Implementation of audio and video HTML5 support</li> <li>Joint tests</li> </ul>
<b>Testing</b>		
"To perform tests against the full platform using as a guide the design document and success criteria."		
Testing	Carrying out tests established in the design document.	<ul style="list-style-type: none"> <li>Transfer functional tests to the full application.</li> </ul>
<b>Total invoicable: €14,848.00 + VAT / €17,520.64 € VAT included</b>		

The beginning of work will be carried out at the end of the first phase, the estimated duration of the project being 12 weeks.



## Phase 3:

### Definition of processes

Below we are providing a description of the processes which are to be developed in order to bring the project to successful conclusion.

#### Improvements of HTML importer

<b>Procedure</b>	<b>Implementation of improvements into the module for HTML importation</b>	<b>POP01</b>
<b>Developer</b>	Open-Phoenix IT	
<b>License</b>	GPL 3.0 (open source)	
<b>Modification</b>	Peripheral	
<b>Component</b>	Current	
<b>Description</b>	<p>Relevant improvements will be implemented in the module for HTML importation.</p> <p>In conclusion: a small configuration assistant prior to importation and automatic extraction of node names from the course content (currently a node is named after the name of the file to which it belongs).</p>	
<b>Dependencies</b>	None	

#### Revision of IDevices

<b>Procedure</b>	<b>Revision of existing IDevices</b>	<b>POP02</b>
<b>Developer</b>	Open-Phoenix IT	
<b>License</b>	GPL 3.0 (open source)	
<b>Modification</b>	Structural	
<b>Component</b>	Current	
<b>Description</b>	<p>The set of current IDevices can contain some with overlapping functionality. It will be detected which are those and decided which ones will be left in eXe's distribution in the end.</p>	
<b>Dependencies</b>	None	

## Mechanisms for adding IDevices

<b>Procedure</b>	<b>Development and implementation of new mechanisms in eXe's interface in order to be able to add more IDevices</b>	<b>POP03</b>
<b>Developer</b>	Open-Phoenix IT	
<b>License</b>	GPL 3.0 (open source)	
<b>Modification</b>	Structural	
<b>Component</b>	New	
<b>Description</b>	<p>A simple mechanism will be designed and developed so that the end user can add in a simple way IDevices developed by third parties.</p> <p>A system will be specified and implemented so that IDevices can be lodged in a remote repository. eXe will be able to add the remote repositories of IDevices in order to download and install them in a simple way.</p>	
<b>Dependencies</b>	None	

## Graphic generator of styles

<b>Procedure</b>	<b>Development and implementation of a graphic styles editor in eXe</b>	<b>POP04</b>
<b>Developer</b>	Open-Phoenix IT	
<b>License</b>	GPL 3.0 (open source)	
<b>Modification</b>	Peripheral	
<b>Component</b>	Current	
<b>Description</b>	A style editor which will permit the alteration of style CSS files in a visual ways is to be integrated into eXe.	
<b>Dependencies</b>	None	

## Inclusion of mathematics editor

<b>Procedure</b>	<b>Inclusion of a stronger mathematics formula editor than the current one and compatible with MathML standard.</b>	<b>POP05</b>
<b>Developer</b>	Open-Phoenix IT	
<b>License</b>	GPL 3.0 (open source)	
<b>Modification</b>	Peripheral	
<b>Component</b>	Current	
<b>Description</b>	Applet Java DragMath for graphical editing of mathematics formula with a possibility of exporting into Latex, MathML o other formats will be integrated into eXe.	
<b>Dependencies</b>	None	

## Work plan

<b>Discovery</b>		
"To obtain a clear picture of the physical infrastructure, design and current structure and the operations surrounding it, as well as to carry out all the previous tasks of defining and provisioning of necessary equipment to complete the project. The Design Document can be submitted in this phase."		
Discovery	A day divided into various activities during the first phase of the project during which specific information is collected necessary for the elaboration of the design document.	<ul style="list-style-type: none"> <li>Screening of the processes to be developed.</li> </ul>
Design Documentation	Elaboration of the design document specifying all the technical details necessary to develop the project.	<ul style="list-style-type: none"> <li>Revision of the screened information.</li> <li>Document writing.</li> </ul>
<b>Preparation</b>		
"To ensure the environment for development based on which is to be carried out the plan in accordance with the design document."		
Systems	Installation and configuration of different operating systems.	<ul style="list-style-type: none"> <li>Installation and configuration of operating systems.</li> <li>Environment preparation in order to automate joint and functional tests.</li> </ul>
<b>Development</b>		
"To undertake the project goals through components development."		
Improvements of HTML importer	Implementing improvements into the module for HTML importation.	<ul style="list-style-type: none"> <li>Implementing configuration assistant prior to importation</li> <li>Implementing extraction of node names from the content.</li> <li>Joint tests</li> </ul>
Revision of IDevices	Revision of existing IDevices	<ul style="list-style-type: none"> <li>To detect functionality overlapping in current IDevices</li> </ul>
Mechanisms for adding IDevices	Development and implementation of new mechanisms in eXe's interface in order to be able to add more IDevices	<ul style="list-style-type: none"> <li>Implementation of changes in the interface in order to be able to add IDevices and IDevices' repositories</li> <li>Specification of Idevices' repository</li> <li>Joint and functional tests</li> </ul>
Graphic generator of styles	Development and implementation of a graphic style editor integrated into eXe.	<ul style="list-style-type: none"> <li>Implementation of the style editor interface.</li> </ul>
Inclusion of mathematics editor	Inclusion of a stronger mathematics formula editor than the current one and compatible with MathML standard.	<ul style="list-style-type: none"> <li>Integration of DragMath Applet</li> <li>Content generation using MathML with a fallback to images generated with mmetex</li> </ul>
<b>Testing</b>		
"To perform tests against the full platform using as a guide the design document and success criteria."		
Testing	Carrying out tests established in the design document.	<ul style="list-style-type: none"> <li>Transfer functional tests to the full application.</li> </ul>

**Total invoicable: €15,232.00 + VAT / €17,973.76 VAT included**

The beginning of the work will be carried out at the end of the second phase, the estimated duration of the project being 12 weeks.

## Services budget

The assesment services and development establish the costs derived from the implementation of this project.

It should be taken into consideration that this is an initial estimate and it should not be considered as a sum that cannot be exceeded or diminished. Nevertheless, the cost of services provided by Open Phoenix IT is €64 per hour. This budget describes in details anticipated hours broken down for every person involved in the project.

Costs, hours	
Pedro Peña Pérez, Developer	€44,416.00
<b>Total (VAT included)</b>	<b>€52,410.88</b>