Co-operative Research project under reference
COOP-CT-2005-017683

Final Activity Report

Version 1.0

March 5th 2007

Creative Authoring Tools for Edutainment Applications	
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Abstract	
Final activity report aggregating all figures of periods 1 and 2.	

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1. Executive Summary

The present “Final Activity Report” aims at providing the information required by the annex II of the contract, as stated in article II.7.

In addition to general and contextual information, it therefore delivers

- A quick summary of the objectives of the project
- Details of the achieved work
- Summary of the project Results
- Plan for using and Disseminating Knowledge

2. Objectives

2.1. Project objectives

U-CREATE was initiated by Alterface, Imagination and ion2s, three SMEs which are primarily active in the field of edutainment, i.e. the joining of education and entertainment (customers are museums, cultural institutions, entertainment parks…) They share a **common and important problem**: efficient **content creation**.

Be it interactive setups, Mixed Reality experiences, location-based services, all these technologies are worthless without content: content is always to be tackled or delivered at the same time as technology. However, content creation is a long process that can turn to nightmare when implementing large-scale projects.

The solution is two words: authoring tool. A powerful, graphical, beyond the state-of-the-art authoring tool is needed that allows one to create elaborated contents in a fast and easy way. No such tool exists to date due to the highly **innovative products** commercialized by the SMEs. **Creating the prototype of such a tool is the goal of the project.**

The authoring tool will increase competitiveness, because it significantly shortens production time (50% reduction of integration time) and effort (creation process affordable to non-specialists) for content development. It will also enable other people to create contents for the intended systems: SMEs can then sell more software while subcontracting or licensing the content production. It will also strengthen the European position in an authoring market dominated by US companies.

Creating the prototype version of the tool, it is another objective of the project to innovate with respect to three particular aspects:

- on the one hand, the tool will rely on visual programming to ease the work of content creators by offering them a user-friendly and easy to learn interface;
- on another hand, Mixed-Reality latest aspects will be included in the tool and will allow one to make the correspondence between real physical places and virtual ones;
- on a third hand, the latest advance in digital storytelling will be brought in order for content creators to be guided through the establishment of their stories and structuring their story in coherence with the interactive aspects.

2.2. Contractors involved

The consortium is composed of three groups.

The SMEs, requiring and validating the research:

- Alterface SA
- Imagination Gmbh
- Sebastian Sauer, ion2s - buero fuer interaction

The RTDs, specifying and developing the tool:

- Università de Genova (DIST department)
- Vienna University of Technology (Compute Graphics group)
- Zentrum für Graphische Datenverarbeitung (Digital Storytelling department)

One end-user partner, further validating the research and animating an open community around it:

- HadroNet Számítástechnikai és Szolgáltató Kft

2.3. Co-ordinator contact details

Project manager: Xavier Marichal (AFC), xavier.marichal@alterface.com

3. Work Performed

3.1. Work Planned

The full project spanned on eighteen months, from mid-June 2005 to mid-December 2006, and was conducted according to the foreseen planning of six major, and consecutive, objectives, carried on by 5 workpackages (+ WP0 for management):

- Establish the requirements of all SMEs for the tool (WP1);
- Create the design of a common tool that meet (most of) all requirements and specify the needed bricks (WP2);
- Achieve the R&D tasks needed to develop the bricks and make them ready for integration into a first prototype (WP3).
- Integrate this first prototype and test it (WP4).
- Improve the prototype and deliver a second version, and validate it (WP4).
- Disseminate the project and pave the way for its exploitation (WP5).

3.2. Problems and Deviations, Corrective Actions

A few delays in the research phase have conducted to a deviation of the overall plan. However, corrective actions have been taken on time, resulting in a modified agenda for the end of the project in order to cope with the delay. The modification mainly consisted in establishing a more iterative mode in WP4 in order to permanently assess the small improvements brought to the prototype.

Details about the issue and the corrective actions are to be found in the third management report (M3: Updated Management Report, including Risk Analysis), which was delivered in September 2006.

Thanks to this corrective action, the entire project has been conducted successfully by December 15, 2006.

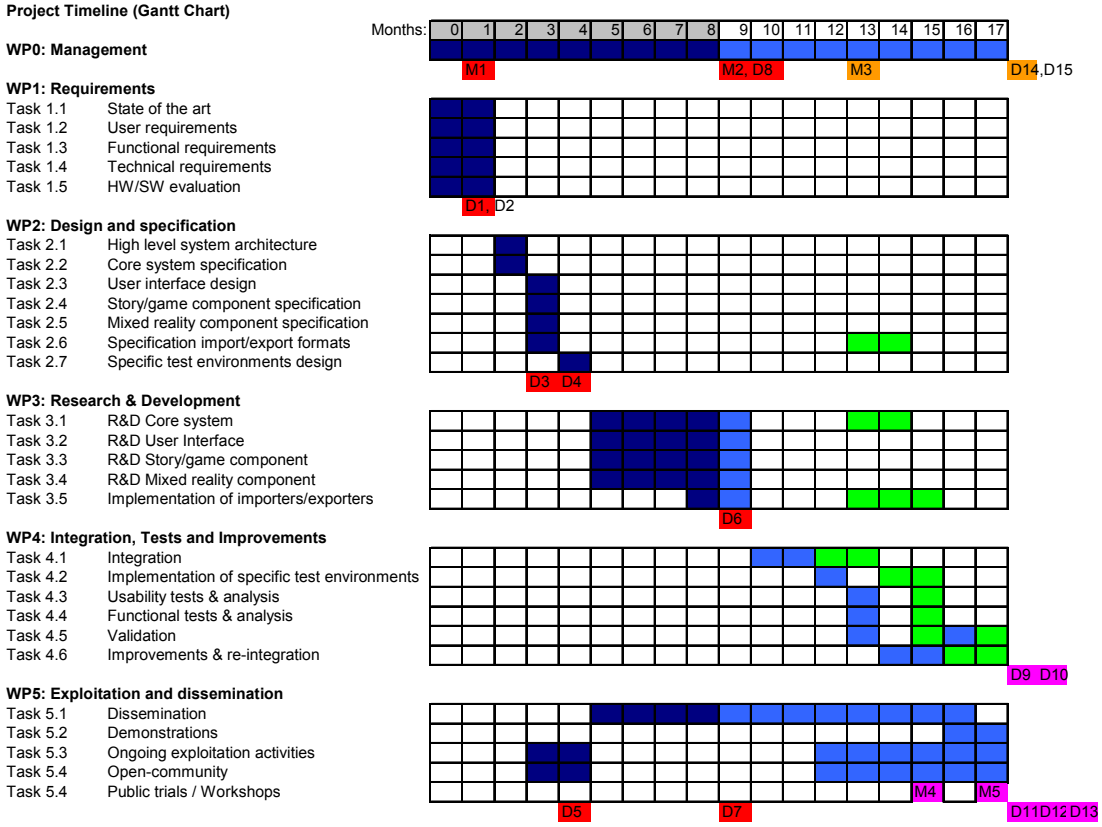
3.3. Details of Activities

The Gantt chart presented hereunder is the final one as it has been implemented by the project.

Tasks as they were originally planned for are presented in blue, and deliverables in orange. Tasks achieved during period 1 are presented in darker colors (dark blue for tasks, red for deliverables).

Tasks that have been modified (i.e. delayed) with the modification decided upon in September 2006 (M3) are presented in green, and postponed deliverables in magenta.

By the end of the project on December 15, all tasks had been successfully completed.



3.4. Completed Tasks

Workpackage 0 has ensured the general management of the project and the correct conclusion of all tasks. Specific contributions are further detailed in section 4 of the present report.

Workpackage 1 aimed at gathering all needs of the SMEs in a formal and exhaustive way.

Task 1.1: State of the art

All RTD contributed to an analysis of the state of the art. Since obviously no needed tool existed on the market, the report specifically focused on the field of expertise and the tools brought by the RTD partners with the goal to help the SME choosing the added value they wanted for their tool. This is summarized in D1.

Task 1.2: User requirements

As the initial procedure for drafting the precise requirements of the intended tool, all three SMEs gathered the needs from their internal users, and also some external ones.

Task 1.3: Functional requirements

Then, the needed workflow has been further described into required functions, along with their degree of importance so as to help the development tool know where to focus efforts first.

Task 1.4: Technical requirements

Data formats, platforms, specific interfaces… were also listed in order to be directly specific enough for the development phase.

Task 1.5: HW/SW evaluation

Requirements in terms of software components (C++) and hardware requirements (PC platform, Windows environment to start with) were also investigated.

Contributions of tasks 1.2 to 1.5 resulted in Deliverable 2.

Workpackage 2 then turned the requirements of WP1 into specifications of the intended tool. This task has been mostly carried out by the RTD partners.

Task 2.1: High level system architecture

At first, all RTD partners aimed at elaborating a high-level system architecture that aggregated all (or as many as possible) requirements from the SMEs.

Task 2.2: Core system specification

In a second step, based on the global view (high level), the main components and interfaces were defined.

Task 2.3: User interface design

With a strong involvement of the SMEs and end-user, the interface has been designed and split into several functional blocks (aka rooms). Every of these blocks has then be further formalized, including:

Task 2.4: Story/game component specification

Task 2.5: Mixed reality component specification

Task 2.6: Specification import/export formats

Finally, import/export formats have been specified, in particular with respect to the scenario formats already used by the SMEs. **Due to the negative evaluation of the exporter in July 2006, some extra efforts have been allocated to this task in the second period in order to further improve the exporter, starting with more advanced specifications.**

Contributions of tasks 2.11 to 2.6 resulted in Deliverable 3.

Task 2.7: Specific test environments design

Drafted by the SMEs, deliverable D4 defines the test scenarios that will be used for validating the integrated prototype.

Workpackage 3 is the one that developed the truly innovative aspects of the U-CREATE prototype. Its main original contributions have been summarized into deliverable D6.

Task 3.1: R&D Core system

A modular and flexible core system has been established so that the specific requirements of every SME are easily met with minimal changes to the needed modules.

Task 3.2: R&D User Interface

A unified interface, with sometimes different interpretation of the same visual elements, has been designed and implemented.

Task 3.3: R&D Story/game component

Finally called the 'Story Editor', this component supports the visual authoring of the story/scenario components as presented in D6.

Task 3.4: R&D Mixed reality component

Finally called the 'Stage Editor', this component supports the visual authoring of individual scenes of a scenario, as presented in D6.

Task 3.5: Implementation of importers/exporters

As correctly pointed out by the reviewer during the mid-term review, this task had been underestimated. More efforts have therefore been dedicated to this task in order to editors) in order to be able to truly convert from and to the formats of the SMEs. In addition, the input wiring editor -also described in D6- allows one to take into consideration the varied and fast evolving needs of the SMEs in terms of input devices.

Workpackage 4 aimed at finalizing the technical work, by gathering all RTD components into an integrated tool. Due to the short duration of the project, it was not planned to have several development cycles, but a second mini-cycle for improvements. However, after the modification during the summer 2006 the methodology was changed to much shorter cycles with permanent test and feedback by the SMES in order to cope adequately with the delay.

Task 4.1: Integration

This task delivered the first integrated prototype (D7) with all needed interfaces between components.

Task 4.2: Implementation of specific test environments

Relying on the various versions of the prototype, the SMEs have every time tried to implement the test environments (which they defined in D2) in order to validate the functionality of the various components of the prototype system. After collecting and preparing all media assets the first time, the SMEs have systematically used the defined example to assess the functioning of the prototype.

Task 4.3: Usability tests & analysis

Employees of the SMEs have tested the prototype to achieve specific goals, and then commented on the quality/usage of the prototype.

Task 4.4: Functional tests & analysis

In parallel to tests were systematically conducted to exhaustively check all aspects of the prototype.

Task 4.5: Validation

Validation of the approach and suitability of the tool for its intended users has been conducted by the end of the project with selected members of the Open Community.

The result of both tasks 4.3, 4.4 and 4.5, relying on the output of task 4.2 is presented in deliverable D10, and final results of the validation with the OC is presented in D14.

Task 4.6: Improvements & re-integration

The part that has been most altered by the modification of the schedule, in order to go for a more dynamic and integrated approach. A lot of improvements have been conducted on the platform, as reflected in D10, relying on the tests conducted in the above tasks. The final result is the prototype presented in D9, along with its source code which has been provided to the SMEs.

Workpackage 5 aimed at disseminating the project results and refining its exploitation routes towards commercial valorisation.

Task 5.1: Dissemination

The project website has been improved and will stay in existence for two years after the project end. Several targeted presentations have occurred in order to attract members for the open community. Thanks to this, and the final validation procedure, every SME now has several beta-testers with whom to pursue the finalization of a commercial tool.

Task 5.2: Demonstrations

In parallel to dissemination, demonstrations of the tool and its intended usage have been organized as often as possible.

Task 5.3: Ongoing exploitation activities

All SMEs and end-user have further confirmed the initial exploitation approach that was drafted in the proposal and allocated means to conduct it.

Task 5.4: Open-community

All partners, but HNET in particular have worked here to the establishment of the U-CREATE open community in order to create the needed platforms for further dissemination, and possibly exploitation through endorsement of the tool by some of the members. The open community will be particularly used during the trial events.

Efforts of these tasks 5.1 to 5.4 are mostly presented in Deliverables 11 and 12.

Task 5.5: Public Trials/Workshops

Three workshops have been organized:

- during Eurographics in Vienna, in August 06,
- during the Festival della Scienza in Genova, in October 2006,
- during the TIDSE conference in Darmstadt, in December 2006.

Moreover, the final validation (task 4.5) has been conducted through a direct test of the prototype by selected members of the Open Community.

4. Results Achieved

- State of the art report has clarified the potential of the R&D techniques for the SMEs and the end-users (WP1).
- End-user requirements have been set (WP1).
- The system architecture has been set to accommodate all requirements from the 3 SMEs and the specifications for the prototype tool have been issued. In parallel, SMEs have defined the test environment that will be used to validate the developments (WP2).
- The needed R&D techniques have been developed and finalized in a first version of the prototype (WP3).
- The prototype has been integrated and iteratively improved according to the tests implemented by the SMEs (WP4).
- Contacts have been established in order to establish a small open community with which events and interviews (WP5) have been organized in order to achieve the final validation (WP4).

- Exploitation and strategy plans, as well as use of knowledge have been refined during the project course (WP5).
- In parallel, from a management point of view (WP0), all intended procedures have been kept and reporting (bi-monthly management and financial reporting and payments toward contractors) and other communication

Despite some small delays and adjustments (cf. above), the project has therefore been perfectly in-line with its foreseen milestones and deliverables.

The prototype has been evaluated in a very positive way by both the SMEs and the OC members who tested it: about 3 out of 4 requirements have been met and the needed knowledge has been assessed for the SMEs to be able to carry on the effort and transform this prototype into commercial applications within 1 to 2 years.

Dissemination has also been carried, with participation and presentation of the tool at several international events. The project website, http://www.u-create.org, will remain alive for two more years.

4.1. Full Deliverable list

All foreseen deliverables have been delivered.

ID	Deliverable name	WP no.	Status	On schedule	Due	Actual
D1	State of the art	1	Completed	Yes	Aug 15, 2005	Aug 12, 2005
D2	User requirements	1	Completed	Yes	Aug 15, 2005	Aug 12, 2005
D3	System architecture and design	2	Completed	Yes	Oct 15, 2005	Nov 15, 2005
D4	Test environment design	2	Completed	Yes	Nov 15, 2005	Nov 15, 2005
D5	Exploitation strategy and open community aspects	5	Completed	Delay	Nov 15, 2005	Jan 15, 2006
D6	R&D techniques and innovations	3	Completed	Yes	Apr 15, 2006	Mar 21, 2006
D7	First plan for using and disseminating knowledge	5	Completed	Yes	Apr 15, 2006	Mar 27, 2006
D8	Mid-term report	0	Completed	Yes	Apr 15, 2006	May 22, 2006 (after required improvements)
D9	Integrated prototype	4	Completed	Yes	Postponed to Dec. 15, 2006	Dec. 8, 2006 for the prototype itself. Jan. 10, 2006 for the report.
D10	Evaluation of the prototype	4	Completed	No	Postponed to Nov. 1, 2006	Jan. 10, 2006
D11	Dissemination activities	5	Completed	No	Nov 15, 2006	Jan. 10, 2007

D12	Exploitation strategy updated and further steps with the Open Community	5	Completed	Yes	Dec 15, 2006	Jan. 10, 2007
D13	Plan for using and disseminating knowledge, addressing open issues	5	Completed	Yes	Jan 15, 2007	Jan. 10, 2007
D14	Quantified Results Assessment	0	Completed	Yes	Jan 15, 2007	Jan. 10, 2006
D15	Final Report	0	Completed	Yes	Jan 15, 2007	Jan. 29, 2007
M1	Management Report, including Risk Analysis	0	Completed	Yes	Aug 15, 2007	Aug 23, 2005
M2	Updated Management Report, including Risk Analysis	0	Completed	Yes	Apr 15, 2006	April 3, 2006
M3	Updated Management Report, including Risk Analysis	0	Completed	Yes	Aug 15, 2006	September 15, 2006
M4	Workshop 1	5	Completed	Yes	Displaced to Oct 25, 2006	October 2006
M5	Workshop 2	5	Completed	Yes	Displaced to Dec 15, 2006	December 2006

5. Plan for using and disseminating the knowledge

In terms of generation of knowledge, the project has already generated a lot of internal knowledge: the specifications and requirements work has enforced all SMEs to put all their ideas on paper, to brainstorm for new ideas and, most importantly, to scrutinize all ideas and sort them all. In parallel, it also enforced the upgrade of documentation (such as the Salto™ Programming Manual) so as to clarify all features of the respective technologies and languages. It resulted in a much better vision about the intended tool, its purpose and scope.

Alterface intends to pursue a thorough evaluation of the U-create authoring tool, both internally (amongst Alterface collaborators familiar with interactive content design, production and deployment) and externally (with potential future users of the tool, like science centers or museums willing to produce interactive setups by themselves).

During these evaluations, we intend to present the U-create software as a first prototype of what a Salto authoring tool could be. Evaluations will be introduced by a simple demo of the software, illustrating our full production lifecycle, from initial story concept to final stand-alone Salto application. Next, the evaluator will be proposed to try the tool by himself and ask whatever question he might have to get a clear understanding of the tool concepts and functioning.

After this practical demo-trial session, an open discussion will follow, centered not so much on the tool current state (missing features, bugs,...) as on what lies ahead in terms of authoring tool development. Our objective is to use the U-create software, and the concrete contact the evaluator will just have had with it, as a stimulus for a discussion rich in creative ideas, specific needs, etc. from potential future users.

Our intention is then to summarize these evaluations in a few concrete guidelines and recommendations « from the field ».

These, combined with the existing U-create prototype, will be the initial specifications for the upcoming Salto authoring tool, developed by Alterface around the existing Salto run-time engine thanks to the bits of code produced by the U-create project.

It is our strong belief that the existence of the U-create authoring tool will be a key benefit for the building of these initial specifications; putting a potential future user in front of a prototype of our authoring tool will make the ensuing discussion far richer and more fruitful as an abstract, purely conceptual discussion on a would-be software tool.

Besides this main use, we will continue using the U-create software as a training exercise for new future Salto developers, as it already represents a user-friendly and coherent way to introduce someone to the concepts of the Salto language and technology.

Imagination will use the U-Create editor as it is now as the basis for further development of an authoring tool for Imaginations production tools (Callisto, Sherezade). The software developed within U-Create will form the basis for a new authoring toll that is much more integrated in the in house tools of Imagination.

Although the outcome of U_CREATE can be used directly for training of young collaborators and for very small installations immediately, for larger project the editor needs to be more tighten bound to the rest of Imagination's tools.

Another possible use of the outcome of U-CREATE is the use of the separate parts of the editor to be integrated into our working environment. The input wiring editor can be used as standalone application as well as the stage editor which allows assembling 2D and 3D elements to a stage set forming a scene.

The ion2s usage plan is twofold. At first, ion2s will involve the tool in its development process for ongoing projects. U-Create, which offers a main platform and delivers the whole workflow, will reduce the actual implementation manpower and licence costs. At the same time, the reduction of the manpower involved on every project will allow ion2s hopefully to tackle more projects every year.

Ion2s plans on using the U-Create editor as the central authoring tool especially for the development of large interactive HTML-solutions. To support the author (e.g. computer scientists, designer, pedagogues, didacts) and to be prepared for following projects, ion2s will create various additional XHTML-templates to get a manifold set of easy to customize templates. In this context one long-term goal is to be able to define a main template (framework) and several content templates so that you can customize the templates in a more fast and easy way.

Previous to a regular usage ion2s will use the U-Create editor within the scope of client acquisition. Especially large projects require a methodical and structural approach and the optimized and custom-tailored authoring tool supports to give such an impression just from the beginning.

Later on, when outcomes are made more robust and closer to a commercial product, a second business line will be developed to sell the authoring tool. Doing so, ion2s will primarily focus on museums and other institutions in order to propose them to integrate their contents by themselves.

Further details about the generated knowledge and known open issues are presented in the separate deliverable D13.

6. Conclusions

Despite its short duration and aggressive timing, the U-create project has reached its ambitious objectives and has empowered the three SME partners of this CRAFT action with a rich prototype (along with its source code) for further creating their needed authoring tool.