1. Publishable Summary

The Transformative, Adaptive, Responsive and enGaging EnvironmenT (TARGET) project aims to empower users with fast, transformative, adaptive, responsive and engaging ways to learn about, to master and improve upon, professional skills and insights in areas that are important to them, their peers, employers and society. To achieve its aim, TARGET has developed an innovative Technology Enhanced (TEL) environment consisting of a learning process supported by a componentised TARGET platform, targeting the domains of project management, innovation and sustainable global manufacturing. The core component consists of a serious game combined with virtual world technologyand emerging storytelling, which provides individuals with complex situations in the form of engaging personalized game scenarios. The serious game component facilitates situated learning that results in experiences supporting the development of competences, whilst the interaction within a virtual world enables individuals to externalise their tacit knowledge acquired whilst engaged with a game.

The TARGET environment achieves a step-change by integrating together the following five key developments:
- Threshold Concepts, resembling knowledge gateways that transform a person's understanding of a knowledge domain
- Knowledge Ecology, which defines knowledge as a "living organism"
- Cognitive minimisation, where the limitation of learner's attention and working memory is taken into consideration, thus maximising the effective internalization without overload
- Learning Communities, where members of a community develop their competences by leveraging the experience of their peers
- Experience Management, to allow learners to accumulate lessons learned through real and theoretical situations

The TARGET project has the following objectives:
- Conceptual Framework, which corresponds to the conceptual blueprint of TARGET, indicating the interplay of all the elements that make TARGET the innovative TEL environment that supports reduced time-to-competence, acquisition of soft complex skills, and higher personalized personal development plans.
- Knowledge model, showing how the stories (game scenarios), thresholds concepts, social data and competences are related
- TARGET Learning Process, which combines together social and individual learning
- TARGET Platform, consisting of a set of components that can be integrated into existing TEL environments, or/and internet platforms
- An agent framework, supporting Non-Player Characters (NPCs) to act as characters within stories and pedagogical agents to act as a personalized artificial mentor to each learner
- TARGET Community involving multiple stakeholders
- Human Resource Management system integration guidelines to facilitate the integration of TARGET within an organization.
- Evaluation Framework, for assessing a learner's competence development

TARGET has three main dimensions of impact:
- **Social**: empowering learners and their communities to identify and achieve learning targets that meet their immediate and longer-term needs as citizens and broaden their horizons.

- **Economic**: improving organizational and individual prospects on this dimension. TARGET will provide powerful ways to train or retrain people quickly to high levels of performance, and hence contribute to overcoming today's shortage of highly competitive human capital qualified to operate in today's world of global competition, rapid and profound advances of technology coupled with the significant increases in uncertainty that we see today, and which globalization is a factor in. The importance of having qualified human capital has led organizations to recognize, as a key business strategy, the need to support tailored competence development that reduces the lead-time for a learner to achieve target productivity. Failure to address this growing business need will lead to organizations that are slow to adapt to their economic environment, which ultimately implies losing their competitiveness in the global market.
- **Academic**: aligning with the "reach-out-to-industry" goals that are increasingly espoused by university leaders and supporters of academic research (e.g. at national level, funding councils), so that a constructive synthesis can be achieved between industry's need for evidence-based insights into innovation, sustainable global manufacturing and project management (TARGET's chosen domains).

TARGET's form of responsive environment delivers added value on each dimension, compared to today's mainstream learning environments and tools, which do not effectively address dynamic competence development in a short time with flexible learning contexts of varying complexity and longevity. In addition, TARGET makes it easier for employers to provide training that treats each learner as a unique individual, with different cognitive abilities, emotional intelligence, personality, knowledge and experience. The approach taken by us is not to develop a single solution tailored to all learners, but rather to support mass-individualization, helping learners to attain novel ways of understanding and the ability to think with different perspectives.

More information, including contact information, is on the project's website: www.reachyourtarget.org. The software corresponding to the TARGET componentized platform is available as open source at sourceforge.net/projects/reachyourtarget/.

1.1 First Year

The first year of the project focused on the definition of the TARGET vision, with the exploration of the five elements of the integrative framework (knowledge ecology, experience management, learning communities, threshold concepts and cognitive minimisation). The first review meeting made us aware that we were pursing too many challenging research objectives across too many frontiers, thus it was necessary to have a clearer definition of our goals towards achieving a viable TARGET environment consisting of a learning process supported by the componentized TARGET platform.

1.2 Second Year

From 1st of June 2010, the consortium was expanded to include five additional partners as part of TARGET-EEU. Their aim is to have the additional learning domain of sustainable manufacturing, which has further contributed towards the validation of the vision as a cross-domain innovative TEL environment.

In this second year of the project, in addition to the consolidation of the vision in the first quarter, the focus has been the implementation of the vision, namely the various components of the TARGET platform. The alpha version of the serious game component was presented at the TARGET project meeting in October 2010, where the feedback was extremely positive and a professor of an executive MBA stated clearly his interest in using TARGET in their course. However, even though the individual components of the TARGET platform have been developed to different levels of maturity, their integration has been delayed due to challenges resulting from the adoption of different implementation technologies.

In addition to the development, the project worked towards increasing the visibility of TARGET in the wider community, namely:

- Participation in the TEL community's summer school with two sessions, one focused on TARGET and the other on the role of virtual environments in learning. In addition, the project sponsored the involvement of two PhD students from Cyntelix and INESC-ID.
- Realization of the TARGET International Summer School on Technology Enhanced Learning, Serious Games and Collaborative Technologies 2010, which was delivered in Second Life, involving more than 30 students from across Europe, USA, China and Russia.
- Strong links have been established as a result with teachers and researchers in Brazil, Russia and China
- Co-organization of the 1st Serious Games Development and Applications workshop in July, hosted by University of Derby. We have secured the bid for its realization for 2nd workshop in 2011 to be hosted by INESC-ID (groups.ist.utl.pt/sgda11/), with proceedings to be published by Springer as Lecture Notes in Computer Science.
- Presentation of TARGET at the annual meeting of ELIG, which has led to the invited participation at Online Educa Berlin 2011 in a pre-conference workshop and as a conference paper.
- A total of 19 publications, 1 book chapter (with additional 2 book chapters in production to appear in 2011).

TARGET has played a crucial role in co-editing a forthcoming special issue of the journal "Entertainment Computing" Elsevier's Journal. The collaboration led further to the establishment from December 2010 of a special section dedicated to serious games in the Elsevier "Entertainment Computer" journal and Manuel Fradinho (SINTEF) is one of the section's editors.

The TARGET project has also established positive synergy with the Threshold Concept community, having two paper presentations at the third biennial Threshold Concept Symposium. The project has promoted further the use and relevance of Threshold Concepts in the areas of project management and innovation, but also contributed insights into how Threshold Concepts can be leveraged in the design and implementation of a TEL system.