

# Program description Dutch Entertainment Computing Consortium (DECC)

## **Program title**

A consortium of industrial and academic institutes proposes a national initiative:

***In search for better gaming concepts and techniques to enhance serious applications: using entertainment as transfer function for health improvement, continuous learning and social cohesion.***

## **Research question**

The Dutch Entertainment Computing Consortium aims at broadening the scope of digital gaming – mainly for entertainment purposes – to enhance the well being (mental health), understanding (cross-cultural) and learning of groups of people that usually do not belong to the target audience of computer games. During the period this research will run, knowledge and experience will be created that will become available for commercial and societal usage. To achieve these goals, the consortium will undertake research into the domains of artificial intelligence and knowledge systems, human-machine interaction and intelligent human media interaction. This coordinated research effort will enhance and focus the current efforts of the consortium members to answer the question how to create meaningful entertainment solutions for serious applications.

## **Target**

The DECC has created this proposal for Research in the Domain of Intelligent Serious Gaming and Interactive Entertainment in order to bring together the research power of at least five universities within the Netherlands and several institutions and organisations.

The main focus of the consortium is the design and assessment of dedicated computer based serious entertainment, building upon similar expertise as in use in computer games for entertainment. A useful example is a 2-3 years manned space mission to Mars. We argue that games may play a vital role for the well-being of the crew, both mentally and physically.

In society we are witnessing several drastic changes, and we anticipate that they are having a great impact on human life in the next decade(s). In advancing industrial societies, human tasks are becoming increasingly complex, requiring higher levels of cognitive abilities and meta-cognition than ever before. As a consequence, there is a growing demand on human capabilities and skills for processing vast amounts of information and abstract knowledge. Mental tasks to be performed such as in automated processes in industry, in aviation, and eventually in long duration space travelling, require high level of sustained attention. During such time spans, human operators involved need to stay alert, concentrated and focused. The example of space travel could as well be viewed as a metaphor for large numbers of people living (confined) in elderly homes for many years, increasingly physically disconnected from family, friends, and public space. Specifically designed games, tuned to their needs and abilities, may provide them a sense of pride, accomplishment, and confidence, and in general, a good basis for feeling well under the circumstances. To prevent any misunderstandings, the games we have in mind should be embedded in 'normal' functioning of living communities. Their use should not deprive the people involved from face-to-face contacts with their peers, and consequently isolate them. In the context of mental health, the applications should monitor that playing the games does not become addictive or an excuse for escaping from life in communities.

## **Envisioned results**

The DECC research and valorisation proposal envisions the design, implementation, and assessment of dedicated (high quality) games for intended audiences and well known contexts of use. Digital games are ICT artefacts, and criteria of success relate to usability-in-context. Statements about mental health are normative, implying that they are social constructions. This understanding will be taken on board as regards the specifications of the design, and the tuning of the artefacts to users needs.

Providing this understanding, we aim at advancing computer gaming according to the state of the art and science of gaming, computing, culture.

Through playing games we are able to increase our understanding of basic features of different cultures. We can playfully engage ourselves in meeting people from other cultures, and learn to appreciate the benefits of cross-cultural communication, enriching our life. Digital games have much potential to reach people in remote areas of the world to meet each other in cyber- or virtual space, as well as in real life.

Also, demographic developments in modern, industrial societies show a gradual shift towards elder people. In emerging economies such as China, India, etc., a proportional large number of young people – often well educated – are entering the global economy. In addition, and due to the increasing impact of advancing medical knowledge and decreasing impacts of famine and malnutrition, industrial societies are facing the risks and opportunities of obsolescence.

Elder people stay in good health longer because of better nutrition and more physical exercise. Nevertheless there comes a time that physical and/or mental capacities start diminishing and deteriorating. When that happens, physical and mental space gradually starts shrinking. In homes for elderly people the staff tries to keep them alert by inviting them to jointly do physical exercises and to play games. Here lies an important opportunity to capitalize on the gaming potential. Recent empirical evidence suggests that playing games, and especially computer games, has a positive impact on the functioning of the brain and the senso-motoric system of both youngsters and elderly people. More specifically, this concerns a more effective performance of specific tasks (such as reaction time) and better general abilities. Moreover, it produces a general feeling of well being as compared with people of the same age not being entertained by computer games.

### **Results according to criteria**

The current high level of research in these fields will be enhanced, become more coordinated and gain momentum through the shared research agenda and the combined effort to create knowledge and experience that can be used for commercial as well as societal purposes.

As argued above and considering the play element of culture, entertainment can play and is playing an increasing role in tool-rich industrial societies. The goals of entertainment computing that we envision are both of physical and psychological nature. To fulfil this role, entertainment content providers should tune their artefacts more in accordance with (future needs) of special interest groups (market niches) to monitor and enhance their mental health (well-being). Therefore, we propose a joint study on the development of future entertainment (e-gaming) by computer scientists, gaming scientists/experts, health experts, multi-media experts, and social scientists.

Target groups are people in need of entertainment for reasons of health assurance (sustaining health), such as elderly people, handicapped persons, and people involved in inter- and cross-cultural communication. Our goals deviate from the current goals of the gaming industry, which does not address health and inter-, and cross-cultural communication questions. Its main target is younger people – up to 35 years of age. These users are not approached for their health, or cross-, and inter-cultural preferences. The game providers still ignore those qualities.

Value creation in both economical and societal terms is envisioned by the consortium.

In economical terms, the program will result in innovation that can be used by the entire Dutch creative industry which are focused on digital and new media hence providing a positive stimuli for the Dutch gaming and entertainment industry. Companies will be able to create top level, world class interactive games for entertainment and serious application.

The societal value creation will be possible through the applications such as mental health, education and training, cross cultural awareness, e.g. increase in productivity and decrease in dependencies from special care will bring down the cost level associated with a graying population.

### **Implementation plan**

To create a strong and valuable research environment, the consortium will create an integrated research plan focused on the longer term research roadmap as well as the development objectives of the industrial partners. The research partners will make sure that senior researchers will contribute.

To ensure valorisation results, the consortium will work closely together with individual companies, trade organisations, and clusters of SME companies. This can be achieved with the creation of labs, learning companies and masterclasses for researchers, university and highschool students with developers from companies. The consortium will disseminate knowledge through conferences and publications.

## SMARTMIX PRE-ANNOUNCEMENT

### DUTCH ENTERTAINMENT COMPUTING CONSORTIUM (DECC)

#### A. GENERAL

##### 1. Program Title:

In search for better gaming concepts and techniques to enhance serious applications: using entertainment as transfer function for health improvement, continuous learning and social cohesion.

##### 2. Consortium participants

TU/e is the lead university for the Smartmix proposal. The key participants are:

- Technical University Eindhoven, Department of Industrial Design, Professor dr Matthias Rauterberg (fundamental)
- University of Maastricht, Institute for Knowledge and Agent Technology, Professor dr Jaap van den Herik (fundamental)
- University of Twente, Human Media Interaction, Professor dr Anton Nijholt (fundamental)
- Free University Amsterdam, Department of Exact Sciences, Dr. Anton Eliëns (fundamental)
- Delft Cooperation on Intelligent Systems, Dr. Cees Nieuwenhuis (application oriented)
- Free University Amsterdam, Faqct. Sciences, Prof. André Kuipers (astronaut, user oriented)
- Free University Amsterdam, DESC-ACTA, Dr. Ing. Jack van Loon (fundamental)
- KMPC, Professor (em.) dr Jan Klabbers (fundamental & user oriented)
- Innosana/Vita Valley, Leo Vollebregt (application oriented)
- MTZ Zorggroep, Jeroen Merckx (application oriented)
- InterimIC, Jan Boers/Cees van Halen (application oriented)

##### 3. Expertise

**TU/e:** Designed Intelligence Group provides expertise on sensor technology, actuators, intelligent system behaviour to focus on research in the context of Ambient Care; Major research lines entertainment systems and cultural computing; and bio-feedback systems and brain-computer interfaces.

**University Maastricht** IKAT provides its knowledge on machine-learning techniques and adaptive game AI. Expertise is twofold. First, research on traditional board games has led to the development of several intelligent search techniques. Second, research into enhancing agents in computer games with the ability to adapt and learn ('adaptive game AI'). IKAT has a large international network of partners, such as The Naval Research Lab (dr. D. Aha) and the GAMES (Uni.Alberta -prof.dr. J. Schaeffer).

**University Twente:** Human Media Interaction provides expertise in the fields of Virtual Humans in Games and Simulations, Virtual Storytelling and Exertion Interfaces. Research will focus on cognitive and motoric behavior of virtual humans in particular in the domain of ambient entertainment requiring bodily interaction through exertion interfaces.

**DECIS Labs:** provides expertise in structuring and formalizing multi-stakeholder innovation by Effect Based Solution processes; AI and Agent-based techniques for knowledge sharing, and decision support for crisis management, cognition and AI. Scientific achievements in information fusion, reasoning techniques, perception networks, situated awareness.

**VU:** Intelligent Multimedia Group will explore the use of state-of-the-art game technology for developing applications with high level of user involvement. Many applications use immersion to involve users in a more compelling way. Research will focus on real applications, in the domain of scientific and technical education, medical communication and assistance with therapy, and in artistic ways, the control of visual experiences, using auto-feedback, for cross-cultural awareness.

**VU:** Fact. Sciences: can advise on actual space flight operations and constraints

**VU:** DESC-ACTA will provide expertise and knowledge in the field of space technology and operation.

**KMPC:** provides the conceptual design - connecting theoretical and methodological questions about gaming, health & entertainment as input to implementation, and assessment of dedicated games for intended audiences and contexts of use.

**InnoSana/VitaValley:** provides expertise and knowledge in the field of medical applications.

**MTZ Zorggroep:** provides expertise and knowledge in the field of health care and elderly homes.

**InterimIC:** provides expertise and knowledge in the field of innovation management and application development

#### **4. Organisation**

Consortium based on a legally binding agreement (type BSIK). Partners establish a professional PM organization with independent advisory board. Work is divided in work packages for which budget will be allocated to individual partners. PM is responsible for dissemination and valorization activities.

A steering group consisting of the main researchers will lead the DECC consortium. Central program management will take care of all organisational aspects and external contacts, to ensure continuity in all research, dissemination and valorisation activities. For each of these three activity groups, a working committee from the consortium members will be set up as well. In addition, scientific, commercial and societal sounding boards will be established to ensure and enhance scientific excellence and support in commercial and societal value creation.

#### **B. Financial commitment**

The total financial budget of the DECC program for the years 2007-2010 is proposed to be 10 million euro's. Of this sum, the consortium requests a subsidy from the smartmix program of 6 million euro's. The financial commitment of the participants in the consortium is estimated to be 4 million euro's, consisting of research personnel, organisational and overhead cost, use of facilities such as research and test laboratories.

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#### **D. Appendices**

##### **1. Program description**

##### **2. Financial commitment**

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