FocusLocus: ADHD management Gaming System for educational achievement and social inclusion

HORIZON 2020

FocusLocus: ADHD management Gaming System for educational achievement and social inclusion

Informe

Información del proyecto

FocusLocus

Identificador del acuerdo de subvención: 732375

Sitio web del proyecto 🗹

DOI 10.3030/732375

Proyecto cerrado

Fecha de la firma de la CE 27 Octubre 2016

Fecha de inicio 1 Noviembre 2016 Fecha de finalización 31 Enero 2019 Financiado con arreglo a

INDUSTRIAL LEADERSHIP - Leadership in enabling and industrial technologies - Information and Communication Technologies (ICT)

Coste total € 1 110 991,08

Aportación de la UE € 999 562,50

Coordinado por "NATIONAL CENTER FOR SCIENTIFIC RESEARCH ""DEMOKRITOS""" Greece

Periodic Reporting for period 2 - FocusLocus (FocusLocus: ADHD management Gaming System for educational achievement and social inclusion)

Período documentado: 2018-05-01 hasta 2019-01-31

Resumen del contexto y de los objetivos generales del proyecto ~

Attention Deficit and Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder affecting a significant part of the population and has a high prevalence of comorbidity. It is characterized by deficits in attention, impulsivity, and hyperactivity. ADHD is usually identified in school-aged children when it leads to disruption in the classroom or problems with schoolwork. It causes considerable behavioural problems, learning limitations in the context of the formal education system and increased chances for social exclusion. Current treatment approaches entail high costs to welfare systems and individuals, while the widespread usage of stimulant medication remains a subject of controversy due to undesirable side-effects.

FocusLocus is an EU-funded Horizon2020 Innovation Action project which brings together a multidisciplinary Consortium of partners aiming to design and produce market-oriented products and services for ADHD management by leveraging knowledge and technology from previous research and innovation activities. The FocusLocus intervention is based on a gaming system that exploits technologies and innovations from the gaming industry and the ICT sector in order to provide a multimodal, personalised, adaptable, and pervasive gaming experience as a beneficial, accessible, and cost-effective alternative to current approaches in ADHD diagnosis and treatment (e.g. medication). The FocusLocus gaming system adopts the concept of asset management as the main instrument of gamification; it will require players to monitor, maintain, associate, combine, and manipulate virtual entities and will introduce challenges that address cognitive and behavioural deficits. More specifically, the implementation is based on the well-established paradigms of Real-Time Strategy and Management Simulation game genres, adapted to the purpose and requirements of the ADHD domain. Even though FocusLocus is being designed, tested and evaluated specifically for the case of ADHD management, it is expected that it will also be beneficial to a number of other associated mental, psychological and cognitive disorders and learning disabilities, thus generating a substantial marketing potential.

The FocusLocus project sets out to achieve the following objectives:

- (a) Develop an efficient game-based ADHD management intervention programme
- (b) Enhance the learning capacity and support the social inclusion of ADHD sufferers
- (c) Innovation through multi-disciplinary technology transfer and knowledge exchange

(d) Generate a valuable data analytics platform to monitor, extract and improve performance for children with ADHD

- (e) Reduce the economic burden of costs for ADHD treatment and Data Collection
- (f) Demonstrate innovative organisational and efficient business models
- (g) Personalised ADHD treatment
- (h) Maximised Market Penetration
- (i) Pervasive Accessibility

Trabajo realizado desde el comienzo del proyecto hasta el final del período abarcado por el informe y los principales resultados hasta la fecha

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The FocusLocus project began with a highly active design process, where user requirements have been expressed, collected and documented, social aspects and considerations have been identified and the learning methodology has been precisely defined. These have been used to define the FocusLocus game mechanics, specify the UX mode configuration and operation and determine the game content design and narrative construction. The gaming system's specifications and architecture has been carefully defined to ensure compatibility of integrated technological components and subsystem intercommunication efficiency. Finally, the precise process of testing, validation, evaluation and documentation in the context of a pilot study has been defined. Throughout the design process, ADHD children, parents and intermediaries have been actively involved and provide feedback through questionnaires, observational sessions and interviews. Following the design process, existing technologies and expertise provided by the FocusLocus Consortium partners has been leveraged, adapted and re-purposed to form the gaming system's constituent technologies and integrated into a unified solution. The integration, testing and optimisation process will continue until the initialisation of the subsequent pilot study in order to deliver a fully functional and optimised system. Agile development methodology has been preferred for the execution of innovation software development activities involving respective iterative in-lab testing across all stages.

Some of the milestones completed are:

- The Gaming System Specifications
- The Game and Pilot Design
- The Operational Prototype

Avances que van más allá del estado de la técnica e impacto potencial esperado (incluida la repercusión socioeconómica y las implicaciones sociales más amplias del proyecto hasta la fecha)

FocusLocus aims to introduce advanced technologies originating from ICT research and gaming industry into non-leisure contexts and specifically into the ADHD domain. The implementation of the proposed game-based intervention is expected to allow children with ADHD to ameliorate ADHD symptoms and overcome associated learning limitations that may lead to social exclusion if left untreated. From a cost-benefit analysis perspective, the FocusLocus will serve in reducing ADHD management costs, as it will provide a cost-effective alternative to currently widespread approaches, such as pharmacological treatment. In order to accomplish a solid market take-up of FocusLocus, a sustainable community of industry actors and stakeholders is established, engaging developers, researchers and end-users in the development of the appropriate Business Model (BM).

Unlike other games specifically designed for children with ADHD, the FocusLocus gaming system, adopts the structure and gameplay of Real-Time Strategy (RTS) and Management Simulation (MS) game genres (e.g. Age of Empires and Simcity, respectively). RTS and MS games have been implemented in non-leisure contexts and they have mainly adopted educational approaches in order to foster targeted learning on specific thematic areas. The use of RTS gaming in cognitive studies is fairly limited, however, the obtained and growing data collected has demonstrated benefits that span

across development and cognitive skills.

FocusLocus therefore aspires to deliver both economic and societal innovations, bearing significant impacts on multiple dimensions and in the areas of technology, learning and behavioural treatment, health, social inclusion, accessibility and economy. The impact of the FocusLocus project can be categorized in the following areas:

-Transfer the ICT know-how from the gaming industry regarding the application of gaming techniques and gamification in non-leisure contexts.

-FocusLocus games aim to ameliorate ADHD symptoms and social inclusion of ADHD sufferers. -Improvement of skills such as: working memory, sustained attention, selective attention, inhibitory control, delay aversion, motor coordination.

-Due to its game system modularity and scalability, the FocusLocus will allow possible future adaptations of the game with the introduction of new content and mechanics that can address ADHD symptoms as well as other learning disorders.

-Provide tools and offer opportunities for systematically supporting a real dialogue between the ICT and social sciences researchers.

-FocusLocus aims to deliver a complementary intervention to established treatment methodologies and provide a compelling, interactive and engaging activity program alternative and eventually achieve lower treatment costs.

-Improve employment rates by helping ADHD children to acquire new skills, adapt to a changing labour market and make successful career shifts.



Multisensory Mixed Reality (MMR) UX game mode



Virtual World Management (VWM) UX game mode



Diagram Illustrating the transition from the targeted skillset into the game UX applications



Factors modulating the learning process as a function of brain architecture & brain function

Última actualización: 22 Octubre 2021

Permalink: https://cordis.europa.eu/project/id/732375/reporting/es

European Union, 2025



Basic elements of the FocusLocus game environment