

Change your lifestyle or your game is over

The design of a serious game for Diabetes

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Abstract—Diabetes mellitus is one of the chronic diseases that leads to great concerns worldwide. This study uses a model of lifestyle change to enhance serious gaming in healthcare. Seven healthcare providers were interviewed in a pre-study, Six patients tested the prototype in a focus group and nine patients co-operated in an evaluation. The theoretical contributions show that it is difficult to design a single game that meets all users needs. One solution is to design a modular application where adaptations can be made in order to meet the patient specific needs, in the presence of the play, meaning and reality components, but also in functionality. Different functionality is needed for non-intenders (play), intenders (meaning) and actors (reality). Practical contributions of this study give the health care providers more insight in the daily activities and personal measurements of the patients and it improves the possibilities for self-management for the patients themselves.

- a. *Which behavior methods are important to induce health behavior change and should be included in a serious game?*

The behavior methods 'education and skills', 'goal setting and action planning', 'self-monitoring', 'reinforcements' and 'observational learning', as presented in the model of lifestyle change and tested by diabetes type 2 patients, resulted to be important to induce a healthy lifestyle. Furthermore in the design of a serious game, the inclusion of these methods as potential

game elements, appeared to be an effective approach.

- b. *What distinction can be made in the population of diabetes type 2 patients regarding to the achievement of lifestyle change and what does this mean for a serious game?*

The division based on the motivation to change lifestyle, here the non-intenders, intenders and actors, was valuable in characterization of different groups in the diabetes type 2 population. From the findings it can be concluded that the major group of the diabetes population are intenders and consequently are the main target group for a serious game. However, for the non-intenders and actors serious gaming also has enough potential to support in the change or improvement of lifestyle.

- c. *What is serious gaming in health care and which game components should be included in order to design a serious game?*

Serious gaming in healthcare needs to add a fun factor in the education or performance of health related task and is divided in health professional- and patient specific games. In the category of patient-specific games, a serious game to educate and coach a healthy lifestyle can include properties of the following type of games: education games, exergames and control games.

In order to design a serious game, the inclusion of the game components play, meaning and reality is important. However, in the actual design of a game, there are always tensions to what extent each of the components should be implemented. This is especially dependent on the target group, and what the actual meaning is of the game and from the game elements containing it.

Main Question - How can a serious game be designed for type 2 diabetes patients that both educates a healthy lifestyle and personally coaches during daily life? -

Based on this study it can be concluded that in the design of a serious game to enhance lifestyle, the use of the model of lifestyle change was very valuable.

Regarding to the actual design of a serious game to educate and coach a healthy lifestyle, it can be concluded that the most important game elements are 'education and skills', 'goal setting and action planning', 'self-monitoring', 'reinforcements' and 'observational learning'. The extent to which the game components play, meaning and reality should be applied in the different game elements, will however differ per group of patients, defined in non-intenders, intenders and actors. While the inclusion of the play component in all game elements can be very valuable to the non-intenders to improve intrinsic motivation to change, for the intenders and actors especially in education it results to have an added value. In the other game elements the play component could generate an extra motivation, but this is individually dependent. In general this would mean it is difficult to design a single game that meets all users' needs. However, a solution is to design a modular application where adoptions can be made in order to meet the patient specific needs, in the presence of the game components, but also in functionality. A serious game as contemplated in this study can be an added value in the current provision of care, as it is one application that provides all tools in the support of reaching a healthy life style. It gives the health

care providers more insight in the daily activities and personal measurements of the patients and it improves the possibilities for self-management. This results in more directed coaching and advises, also in between the quarterly controls. The intensity of use will differ for each group of patients. A patient can use it intensively in the first period after diagnosis, but when a healthy lifestyle is reached it will be used more like a reference. For the patients who are often monitoring their personal measurements, the application could be used even on daily basis. In summary, the use of serious gaming to educate and coach a healthy lifestyle in daily life is a promising approach in the optimization of the diabetes care, which will be increasingly important in the coming years. The details of the application should however still be further investigated.

Keywords: Serious gaming; lifestyle change; diabetes type 2; E-health.

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