

# Develop an Evaluation Tool for an Ontology on Traumatic Memories:

*And help with the knowledge base of a virtual agent which assist patients with Post-Traumatic Stress Disorder*

**Keywords:** Evaluation system, Ontology, Knowledge base, Behavior change support systems, Virtual Agent, Memory Recollection, Trauma

## Introduction

Behavioral change support systems are computer systems which are designed to assist people in changing their behavior. Applications for these systems are for instance in education and both regular and mental health-care. Virtual agents and conversational systems often play an important role in such systems, adding a social aspect. Mental-healthcare is a rather new field of application where the possibilities of using such systems are promising. Behavioral change support systems can help with detection, monitoring and therapy of illnesses such as depression and post-traumatic stress disorder (PTSD). An important skill the virtual agents in such systems need to have, is to pose meaningful questions on a specific topic. For instance, in PTSD therapy patients need assistance in describing their traumatic memories, and a virtual agent can assist through questioning them at the right moments.

In order to do this though, the agent needs some knowledge about the topic of conversation. One way to implement this knowledge is through ontologies, a computational structure of concepts which a computer can reason about. The main problem with using ontologies is that they need to consist of specific domain knowledge (such as trauma), but are built by computer scientists who don't always have this knowledge. Additionally, the experts are not familiar enough with ontologies to be able to review them properly in their original format.

## Assignment

For this project, you'll be working on this problem. Specifically, you'll be working on an application through which non-computer scientists will be able to evaluate ontologies for question systems. The use-case you'll be using is an ontology about traumatic experiences. Your job will be to create and evaluate a system which presents the ontology in such a way that psychologists or patients will be able to review the content in a simple and intuitive manner. Ideally, this system will also be able to adapt the ontology to their input automatically. In order to achieve this, you'll be working with psychologists in developing and evaluating the system.

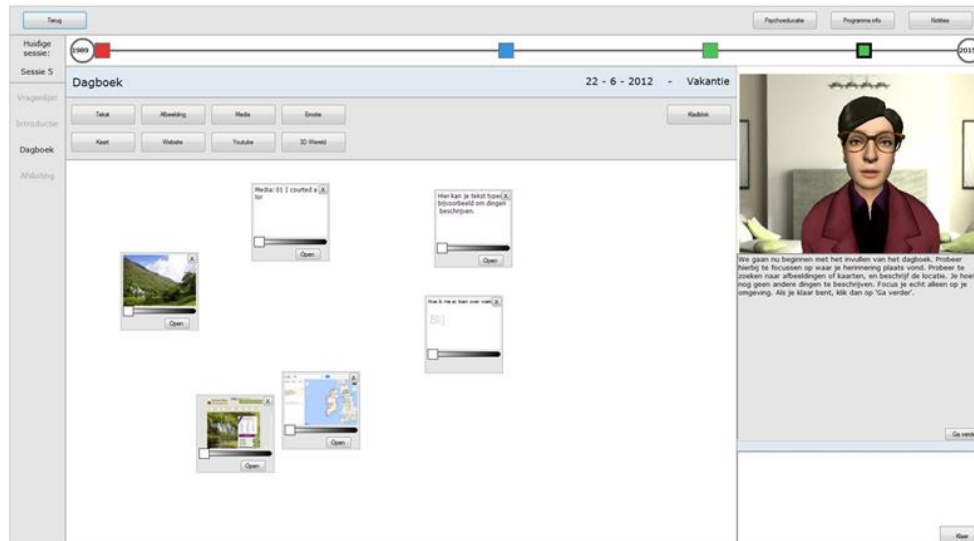
## Context

This proposal is part of the Virtual E-coaching and Storytelling technology for Post-Traumatic Stress Disorder project (VESP: <http://ii.tudelft.nl/vesp/>). In this project, a stand-alone computer therapy for PTSD is developed, named the 3MR system. The work package your research will be a part of is the development of an intelligent conversational agent to assist with therapy. Specifically, this agent needs to ask the patient questions to help them confront their trauma. The patient has a digital diary in which they can answer these questions, employing text, pictures, music, maps and the



1. Virtual Agent

internet to describe memories. Additionally, the system consists of a 3D editor in which patients re-build their memories with 3D models. An ontology for trauma has already been developed with the assistance of experts in the field (therapists). Your work will be an extension of this project. This means that you'll be able to use an existing ontology on trauma as a use-case to test your evaluation system.



2. Screenshot of the diary in the 3MR System & a Virtual Agent

## Planning

In the beginning of your project, you'll be working out the direction and main focus of your research. After this start, the project will have 4 phases. The first will be a small literature study to get familiar with the field and build a solid base. Additionally, you'll be talking to experts (psychologists) on what constraints exist for the system you'll be building. The second phase will be to make a model of what the solution would look like and how it should work. The third phase will be implementation. The fourth phase will be a short evaluation with users to test your concept.

## Who are we looking for?

A Master student looking for a graduation project who has:

- A background in computer science, artificial intelligence, human-computer interaction or similar.
- Experience with programming (java or C#)
- Interest in knowledge systems and ontologies (experience with ontologies is useful, but not necessary)
- Interest in real-life applications for smart systems, such as virtual agents
- An interest in how we can employ knowledge from other fields (such as psychology) to improve computer science solutions

## Contact person:

If you are interested in this project, or want more information you can contact:

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