

Autotutor&Betty'sBrain: Training learners in 'first aid' - SS2

1. What are the goals of the learning environment in relation to the specific task chosen? What is the context in which the teaching is intended to take place?

2. *Who are the intended learners? How does the environment adapt, or customise its teaching, to the learners? Are both cognitive and affective aspects adapted to?*

Environment:

Intelligent tutoring environment, consisting of virtual human-alike tutor, virtual patient(s) and the student using virtual reality set, Autotutor Emotion Detection components, and Rescue Anne doll with pressure, breathing and movement detection systems. Tutor agent tries to adapt to both cognitive and affective state of the user. The tutor acts in all kinds of ways to maximise learning outcome, it should create the right emotional environment to both bring the student as close to the real world environment and to optimise their knowledge gain.

The tutor starts by presenting real like scenes describing the and demonstrating appropriate actions. Then the student has the opportunity to mimic the tutor's actions and apply the knowledge in further real-like accident environments. The tutor monitors the student's emotional and cognitive state to pick consecutive environments, choosing from easier and calmer to more difficult and stressful situations as appropriate. Eventually the student has the opportunity to teach other virtual agents via mindmaps interface. The virtual tutor delivers feedback (Autotutor face feedback feature) on how well the other agents did (the student may ask questions about why they failed) and the student refines the mindmap.

General task:

Teaching first aid adapted to the user's emotional and cognitive state reinforced through knowledge transfer.

Specific teaching tasks:

Teaching to recognize the type of accident.
Teaching CPR.

Recognizing the student's emotional and cognitive state (Autotutor Emotions).
Adapting the environment to match it (Autotutor Emotions).
(Advanced) Giving feedback on student's teaching of first aid (Betty's Brain).
Testing the knowledge via knowledge transfer (Betty;s Brain)

CPR:

[Six steps:](#)

- Step 1: Shake and shout
- Step 2: Check for normal breathing
- Step 3: Call 999
- Step 4: Give 30 chest compressions
- Step 5: Give two rescue breaths !
- Step 6: Repeat until an ambulance arrives

Users: Autotutor adapts the type of scenes and material thought to match the target audience, e.g. simpler, less stressful environments for school children, high stress and

complexity situations for medical staff, highly specific situations for a person living with a patient ill with a particular disease.

Adapting to cognitive and affective state:

Cognitive - If the student makes mistakes the virtual tutor is brought to the front of the screen and depending on the mistake the tutor can explain again, help the student assess the situation better, give more information about the procedure and the ideas behind it, give a hint, show approval/disapproval or motivate the student to focus.

Affective – The system is equipped with all kinds of sensors to detect the emotional state of the learner. If the student does not take the situation seriously enough the tutor tries to motivate and give statistics about real-world victims and how important it is. If the student is working on the task the tutor tries to increase the stress levels. Or if there are very high stress levels detected the tutor tries to teach the student how to handle such situations calmly.

4. What approach does it take to teaching? Why is this approach suitable for this task?

The approach is suitable for the task:

- real-like virtual environments provide high quality imitation of an accident situation, which is a big factor interfering with the student's ability to apply the knowledge learned from a first aid demonstration,
- emotion control helps find a good balance between inducing a high stress scenario and maximising student's learning goals while keeping track of their mental comfort,
- Betty's Brain learning by teaching concept reinforces and promotes the organization of acquired knowledge,
- inspires students to pass on the knowledge which can be further optimised specifically for first aid instructors.

Papers:

[Affect in tutoring dialogues - Dirk Heylen, Anton Nijholt, and Rieks op den Akker & Department of Computer Science, University of Twente, Enschede, The Netherlands \(2005\)](#)

[D'Mello, S., Lehman, B., Sullins, J., Daigle, R., Combs, R., Vogt, K., ... & Graesser, A. \(2010, January\). A time for emoting: When affect-sensitivity is and isn't effective at promoting deep learning.](#)

[Tan, J., & Biswas, G. \(2006, January\). The role of feedback in preparation for future learning: A case study in learning by teaching environments. In *Proceedings of Intelligent Tutoring Systems \(ITS 2006\)* \(pp. 370-381\). Springer Berlin Heidelberg.](#)