

TASK:

- First aid (**Burns**, CPR, Bandaging cuts)
 - <http://www.sja.org.uk/sja/first-aid-advice/hot-and-cold-conditions/burns-and-scalds.aspx>
 - <http://www.labour.go.ke/resources/category/9-dosh-download.html?download=112:dosh-6-firstaid-curriculum>

DESIGN:

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?
 - a. Goals:
 - i. Through a more realistic experience, learn how to do first-aid better (ex: burns)
 - ii. More engagement → Increase motivation, presence, etc. → Remember it better
 - iii. Understand how to apply it to real life
 - iv. Easy to transfer skills because of AR compared to traditional training
 1. Nurses' training. In their responses, their rated AR more realistic & immersive & engaging
 - a. <http://medicaugmentedreality.com/2014/10/training-nurses-using-augmented-reality/>
 - b. <http://campus-interactive-media.com/work/test-work/>
 2. AR vs VR -- VR you can tell things are rendered; AR you still see your hands and your world; AR's hands-on experience improves engagement
Chavan, Sagar R. "Augmented Reality vs. Virtual Reality: What are the differences and similarities?." Int. J. Adv. Res. Comput. Eng. Technol 5.6 (2016): 1-6.
 - b. Administering learning/curriculum by incorporating into an existing First Aid course -- Ex: Crystal island and Cognitive/autotutor (?)
 - c. Our focus is on the subject not on the entire environment
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?
 - a. Intended learners:
 - i. Adults -- potentially a business environment; Both people that have and haven't done it before; Anyone taking
 - b. Environment adapts by:
 - i. How the user is responding to the problem
 - ii. Making mistakes = receiving similar problem again
 - iii. Companion adapts to affective aspects
 - c. Cognitive & affective aspects (Requires sensors to measure physiological responses to infer emotional states):
 - i. Stress levels of the user
 - ii. Boredom

- iii. Confusion -- practical hints
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. In Proceedings of Intelligent Tutoring Systems (ITS 2010) (pp. 245-254). Springer Berlin Heidelberg.
- 3. What approach does it take to teaching? Why is this approach suitable for this task?
 - a. Practical approach; Hands-on interaction with the dummy; Receive responses through the AR system
 - i. Increase presence levels; more realistic → need to engage more
 - ii. Reference: Crystal island -- learning by experience; Procedural knowledge vs. "Information"
 - b. Provide real-time feedback (through virtual companion and dummy)
 - i. Remember things automatically
 - ii. Pro-tips: Bandaging joints, etc.
 - iii. Reference: Betty's brain & Autotutor -- "Am I doing this right?"
 - c. Assessment by first-aid instructor
 - i. Judge how well the user responded via a separate screen
 - ii. Summary for teacher: Mistakes made, Emotions detected, Time taken, etc.
 - 1. Reference: Crystal island
- 4. How does the system interact with the user? Describe an example interaction: you may use possible screenshots, hypothetical dialogues, etc.
 - a. The first aid course provides users with learning concepts (Theory introduced by others)
 - b. System provides the practical bit
 - c. Virtual companion
 - i. Don't need to exit world for feedback
 - ii. Judges affective feedback from user to provide suitable feedback
 - iii. Sensors on dummy and to measure user's pulse/retina for stress level
 - 1. Changes companion response
 - d. Real-world feedback -- Ex: Dummy can scream out in pain
 - i. Check for responses in real first aid, so user also checks for dummy responses
 - 1. Dialogue with companion to infer emotional states
 - ii. Voice recognition -- by smartphone connecting to internet? (May not have to specify technical details)
 - e. **Example interaction** -- Burns -- User puts on bandages
 - i. Obtain bandages
 - ii. Put on bandage
 - 1. Put on bandage too tight → Dummy provides negative feedback (ex: complains and screams out in pain)
 - 2. Put on bandage just right → Dummy provides positive feedback

RELATED SYSTEMS:

1. Autotutor -- sensing engagement
2. Crystal Island -- game-like
 - a. Student model equivalent to different levels of the game
 - i. End of level assessments (flow charts?)
 - ii. Spot what the other person was doing wrong
 - b. Different situations where student has to make choices about what conditions affect them
 - i. Do they know how to react to different variables
 - ii. If they forget a step, test that step more
3. Betty's brain -- conceptualization
 - a. (Maybe a stretch -- which system allows student to inspect their model?) Student modeling through a concept map --
 - i. Flowchart of steps that you need to do in first aid -- Concept map to see if you're following these steps well
 1. Calling ambulance, seeing if someone has a phone -- linking logical tasks
 2. To fix a hand, use your hoodie
 - ii. Student has access to concept map
 - b. Learning by teaching someone else
 - c. Once you know what to do, make the tree of options yourself
Using conceptualised knowledge



<https://www.youtube.com/watch?v=JGiVVObY0Ew>



REFERENCES

1. [Case Study] - Nurses' training with AR
<http://medicalaugmentedreality.com/2014/10/training-nurses-using-augmented-reality/>
2. Dual Good Health - VR first aid training
<http://dualgoodhealth.com/>
<https://www.youtube.com/watch?v=6CuvyXcRV2w>
3. MediSIM - Using HoloLens for patient examination training
<https://www.medisimulation.org/>
<https://www.youtube.com/watch?v=JGiVVObY0Ew>
4. 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. *In Proceedings of Intelligent Tutoring Systems (ITS 2010) (pp. 245-254)*. Springer Berlin Heidelberg.
5. Nye, Benjamin D., Graesser, Arthur C., & Hu, Xiangen. (2014). AutoTutor and Family: A Review of 17 Years of Natural Language Tutoring. *International Journal of Artificial Intelligence in Education, 24(4)*, 427-469.
6. Rowe, Jonathan P., Shores, Lucy R., Mott, Bradford W., & Lester, James C. (2011). Integrating Learning, Problem Solving, and Engagement in Narrative-Centered Learning Environments. *International Journal of Artificial Intelligence in Education, 21*, 115-2), p.115-133.