***Navigated via Adapting Music: Notes***

What problems are they trying to resolve

* Help a pedestrian navigate to their destination using calming sounds (music)
* Difficult to use both device and control music at the same time

Introduction of System

* Acoustic sounds from the music will relate to certain directions made by the navigation system, for example if a sound balances to the left, it means take a left
* Minimising the impact of disruption to the user by playing very ambient sounds and effects to instruct them

Implementation

* Implemented on a PC inside a simulation of a real world hospital.
* Users can then navigate throughout the world using the directional keys whilst having earphones on which should instruct them on their route to their destination
* Beacons are placed at destinations which the user may visit on their route to the destination
  + If a user is facing their destination then music is played at a normal level.
  + If they are getting closer/further, music will increase/decrease respectively.
  + If they turn away from the destination, then depending on the direction they turn away, the music will begin to balance to the opposite side
* Once the beacon has been reached, the volume and balance of the music will reset and the system will restart but with the next beacon in route as the destination

Evaluation Setup

* 25 staff/students taken from universities were used for testing, they were split up randomly into two groups which had been allocated to one of the following methods:
  + Ontrack: In the hospital simulation
  + Map: Similar to OnTrack with the virtual world, however the music did not adapt to the users environment; it stayed the same. Instead they received a birds-eye view of the hospital which they can refer to at any time
* Each person had to complete 3 navigation tasks (in each case, the start/end points were different)
  + Tasks A & C were long and complex and Task B were simple
  + Order of the tasks were randomized for each user
* Users were given introduction to the system that they were going to use for the experiment, also a simple training procedure was executed
* To finish, users were given a questionnaire to assess the physical and cognitive load of the methods they used

Evaluation Results

* Success Rate
  + The Map method had a higher success rate and also its mean average for completion time was 12 seconds quicker
* Overall Mean Completion Times
  + Task A
    - Map method was faster by 50.2 seconds
  + Task B
    - OnTrack method was faster by 5.2 seconds
  + Task C
    - Map method was faster by 4.4 seconds
  + Implies that OnTrack is faster for shorter distances but slower over larger, more complex distances
* Task Load Ratings
  + For all of the dimensions, OnTrack proved to be a lot more beneficial in terms of task load compared to Map

Conclusion

* Promising new approach as users were able to follow routes based on this navigation method
* Further research suggests that OnTrack can become less cognitively demanding and more enjoyable, improving efficiency and performance times

Tutorial Notes

* Personal Evaluations of System
  + Could only travel at a preset speed
  + Could be annoying if you enjoy the music and the OnTrack system keeps altering the music
  + Current music may already have the effects embedded into the track which can be confused with the OnTrack instructions for example, music balancing or volume changes
    - Should be tested across various genres of music
  + Gaps between the tracks could have an impact on the instructions from OnTrack
  + Actual focus on the song can vary depending on the song being played
  + Quality of the earphones may have an impact
  + Impact on people with visual impairments, as they will not use both earphones while walking as they need to use sounds as a means of navigation
  + In the experiment, people are only focusing on moving their avatar and not about other external impacts
  + 25 people, difficult to make it biased as the group sizes are un-even
  + Could have compared it to an electronic method of navigation such as Apple Maps or Google Maps, as majority of people do use paper maps.
  + Tourism: Not going to be listening to music whilst looking at tourist attractions
  + Real World Problems
    - Real-world can have an impact on the sound coming through the earphones
    - Problematic if an instruction is missed, unaware of how to 'replay' the instruction
    - Problematic if a repeated instruction is necessary, for example taking 2 lefts
    - Problematic if a direction which is not forward, left, right or backward is required (potentially implement 3d spatial awareness, but still not complete problem resolution)
    - Did not re-route depending if a wrong direction is travelled
    - Problematic if a system problem occurs, for example a phone call, notification etc. May have an impact on the directions provided by OnTrack
* Points from the Article
  + Numerically, very slight difference. However statistically, it was not very different
  + OnTrack was more favourable, but not by a significant amount
  + Other possible uses; Tourism, Find a Friend, Child Monitoring (already in the article)