**Personas**

**Best Case User - Sarah**

* **Role**: Paediatrician with a focus on pulmonary diseases. Responsible for diagnosing, treating, and monitoring children with asthma and other respiratory conditions.
* **Demographics**:
  + **Age**: 38
  + **Gender**: Female
  + **Culture**: British
  + **Lifestyle preferences**: Active, goes jogging in the mornings, vegetarian.
  + **Income**: Middle to upper class.
  + **Educational status**: MD with specialization in paediatric pulmonary conditions.
  + **Personality**: Analytical, empathetic, health-conscious.
* **Task Domain**: High expertise in asthma management and prevention. Became inspired to become a paediatrician after being diagnosed with asthma and has over 10 years of experience treating paediatric asthma patients.
* **Technological (ICT)**: Very comfortable with technology. Uses medical databases and tools daily. Owns the latest smartphone and is comfortable with wearable devices.
* **Human Factors & Accessibility**: No vision, hearing, mobility, or cognitive impairments. Takes precautions to maintain a healthy lifestyle.
* **Information needs and preferences**:
  + **Must**: Real-time air quality data, historical data logs.
  + **Should**: Location-based alerts, easy synchronization with mobile devices.
  + **Could**: Monthly air quality reports, recommendations for areas with better air quality.
  + **Would Like**: Integration with other health apps, community sharing features.

**Worst-Case Scenario - Brian**

* **Role**: Retired coal miner. Worked in mines for over 35 years.
* **Demographics**:
  + **Age**: 65
  + **Gender**: Male
  + **Culture**: American, from a rural background.
  + **Lifestyle preferences**: Sedentary lifestyle, smokes occasionally.
  + **Income**: Lower middle class.
  + **Educational status**: High school graduate.
  + **Personality**: Resistant to change, sceptical of new technology.
* **Task Domain**: No knowledge of asthma other than being diagnosed with it due to prolonged exposure in the mines.
* **Technological (ICT)**: Limited experience with technology. Uses a basic cell phone and has never used a smart device or wearable.
* **Human Factors & Accessibility**: Mild vision impairment, hearing difficulties, beginning stages of osteoarthritis in the knees.
* **Information needs and preferences**:
  + **Must**: Clear alerts for dangerous air quality.
  + **Should**: Simple, easy-to-understand readings without much technical jargon.
  + **Could**: Reminders to use inhaler or medication.
  + **Would Like**: Easy tutorials or guides on how to use the wristband.

**Average User - Michael**

* **Role**: Middle school teacher. Often involved in outdoor activities with students.
* **Demographics**:
  + **Age**: 45
  + **Gender**: Male
  + **Culture**: Canadian
  + **Lifestyle preferences**: Semi-active, occasionally plays sports, non-smoker.
  + **Income**: Middle class.
  + **Educational status**: Bachelor's in Education.
  + **Personality**: Open to new experiences, somewhat tech-savvy.
* **Task Domain**: Diagnosed with asthma at a young age, carries an inhaler, has basic knowledge about triggers and management.
* **Technological (ICT)**: Comfortable with smartphones, computers, and basic tech gadgets. Uses technology mainly for work and leisure.
* **Human Factors & Accessibility**: Mild short-sightedness, uses glasses. No other significant impairments.
* **Information needs and preferences**:
  + **Must**: Instant alerts for harmful environments.
  + **Should**: Ability to review data over time.
  + **Could**: Tips for managing asthma based on data.
  + **Would Like**: Integration with calendar or daily planner apps and community sharing features.

**U/T/S/E Analysis**

**Sarah:**

**User:**

Sarah is a 35-year-old woman who lives in Britain. She is a paediatrician with asthma and is specializing in pulmonary diseases, focusing on children with asthma. Her expertise is backed by an MD degree with a focus on pulmonary medicine, and she has accumulated over a decade of experience in treating young patients with asthma. Sarah works long hours in a small office which she examines all her patients in. The ventilation and air quality of this room can sometimes affect her and her patients breathing as well as cause problems Staying in this space for longer periods of time can cause her breathing problems. She is very comfortable with technology as she often uses it in the medical field and is used to wearable technology as well.

**Task:**

Sarah's primary task consists of several key steps. First, as part of her morning routine, she ensures to take her air quality monitoring hub with her before going to work. Once she reaches her office at work, she sets her air quality hub down on her table in order to monitor changes in the air quality over time. If the data indicates deteriorating air quality, she can modify her schedule to change when and where she examines her patients in order to avoid asthmatic problems for her and her patients. This will enhance her experience at work while allowing her to provide more informed recommendations in her role as a paediatrician.

**System:**

Sarah's conceptual model of the system includes the seamless integration of an air quality monitoring hub and smartphone app. The hub, equipped with particle matter sensor, gas sensors, and GPS serves as a real-time data collector during her work hours. This data is continuously synchronized with her smartphone app, where she accesses and analyses the air quality information. The app offers a user-friendly interface, displaying real-time readings, data logs, and location-based alerts. This conceptual model reflects her need for immediate, and accurate air quality data to ensure her safety during working hours and support her professional expertise in asthma management.

**Environment:**

Sarah's environment for using the air quality monitoring system is during work in her office around. Distractions in this environment could include her being more focused and work and taking care of her patients. Sarah's main focus is on her patients, making the simplicity and user-friendliness of the device and its app crucial. The system should minimize need for interaction and allow her to integrate air quality monitoring into her work without much effort.

**Brian:**

**User:**

Brian is a 65-year-old man who lives in America. He has worked in mines for over half his life and as a result of breathing in harmful particles, has been diagnosed with asthma. Brian has a severe and sensitive case of asthma which is often triggered by small things such as dust so he spends a lot of his time indoors in order to reduce the risks of causing an asthma attack. Brian is generally resistant to change and sceptical of new technology, with limited experience and comfort in using it. He faces some physical challenges, including mild vision impairment, hearing difficulties, and osteoarthritis in the knees.

**Task:**

Brian's task begins by pairing the air quality monitoring hub to his phone and placing the hub in an area of his house that he will be spending the next while in, the sitting room for example. The hub continuously collects air quality data, which can be viewed within the app on his phone. Brian must set up the app so that he can receive alerts and notifications regarding the current air quality. If he does end up wanting to go somewhere, Brian can view history logs of air quality on his area through the use of GPS and can therefore plan his path to possibly avoid the areas with the worst air quality. Brian can view the air quality levels at any time he wants by manually going on the app and checking the location info.

**System:**

Brian's conceptual model of the system revolves around simplicity and clarity. He perceives the air quality monitoring hub as a simple tool to enhance his health and well-being. For Brian, the hub is primarily a means to detect and alert him to dangerous air quality conditions in the areas of his house that he spends the most time. His interaction with the system is centred on receiving real-time feedback about the surrounding air quality. The alerts he gets guide him in making informed decisions to avoid asthma triggers. Overall, his conceptual model is a simple to use, portable hub which detects deteriorating air quality and gives him safety warnings and alerts when the air quality may lead to triggering his asthma.

**Environment:**

Brian's most likely environment for using the air quality monitoring system is in his home. Given his lifestyle and health challenges, he spends a significant amount of time in his own house as it can be challenging at times to traverse the outdoors. The system needs to offer air quality monitoring within his home environment, where he may often come across his common asthma triggers such as dust. Brian may also use the system when planning short walks outdoors. To account for Brian's limited mobility due to the osteoarthritis, the system should be easy to operate without excessive physical demands.

**Michael:**

**User:**

Michael is a 45-year-old man from Canada, has a Bachelor's degree in Education, and is a middle school teacher. His role often involves engaging in outdoor activities with students. Michael enjoys a semi-active lifestyle, occasionally participating in a wide variety of sports. He is tech-savvy as he often engages with technology in the classroom and has become fairly familiar with it by now. Michael was diagnosed with asthma at a young age and carries an inhaler, granting him basic knowledge about asthma triggers and management. With mild short-sightedness requiring the use of glasses, he has no other significant impairments.

**Task:**

Michael's primary task centres on using the air quality monitoring system to safeguard his health, particularly during class time while he is indoors with his students for an extended period of time. Firstly, he places the air quality monitoring hub on his desk, which will collect data about the particle matter and gas intensity in the area. Michael relies on the accompanying smartphone app during this time to receive instant alerts for harmful environments. The app also allows him to review collected data over time, aiding his understanding of air quality patterns. If the air quality does begin to deteriorate, then he may want to take his lesson outside in order to take a break from the classroom until the bad air quality clears.

**System:**

Michael's conceptual model of the system is focused around the systems user-friendliness, instant alerts, and long-term data access. The air quality monitoring hub, for him, serves as a tool for continuous data collection during outdoor activities with students. The hub synchronizes well with the smartphone app, which is his primary point of interaction with the system. The app's most essential feature for Michael is the instant alert system for harmful environments. These immediate notifications play a crucial role in his asthma management, guiding him to make necessary adjustments during outdoor activities. Additionally, the app allows him to review air quality data over time, providing valuable insights into environmental patterns.

**Environment:**

Michael's most likely environment for using the air quality monitoring system is going to be in the classroom while he is teaching his students. The system's user-friendliness is essential, as Michael manages his professional responsibilities while ensuring a healthy environment for himself and his students. In the classroom, Michael uses the air quality system to keep an eye on the air quality status while in the classroom. He looks for immediate alerts to protect his health and that of his students. The system should blend seamlessly with these environments to help him make informed decisions about the current situation. There will be some distractions in this environment which are to be considered when Michael is making use of the system such as the fact that his main focus will be on teaching and helping his students.