Background, introduction and literature review

* Introduction
  + Aim and objective of the study
  + How it will contribute to the field of neurorehabilitation
  + Back ground on why the work is important
    - Include statistics, NHS, need for more accessible rehabilitation programs
    - Science behind upper limb sensory motor deficiency and what can cause this
    - How does sensory motor deficiency impact individuals’ daily lives and why the recovery process is important
    - What happens if a patient does not perform the necessary rehabilitation exercises
    - Paragraph explaining what haptic devices are and do and about the force dimension delta device And Explanation of unity (this could go in my methodology)
    - Paragraph on VR, benefits and previous studies done with these
    - How implementing VR and haptic feedback will benefit patients, include an previous studies to support this. Importance and benefits of robotics/haptics and virtual reality in the process of recovery
    - And how this will be better than current rehabilitation techniques e.g speeding up rehabilitation processes, keeping patients more engaged etc, give references to this
    - Provide information on old rehabilitation techniques and their flaws/strengths. How can haptics and VR overcome these problems
    - Where have I drawn inspiration from to design VR and incorporate haptic technology
    - What can be used to measure patients improvements, what has been used in the past to measure improvements
    - Linking VR and haptic devices
      * Use of client server architecture for communication between haptic devices and VR
      * Include other types of architecture previously used to integrate haptics and VR (Escobar-Castillejos *et al.*, 2020)

Literature review:

* Find sources and literature of previous studies in this area
* Design a table that has each paper in, each papers will have these sections:

Literature review structure:

* Background: (Sensinger and Dosen, 2020) – in prosthetics
  + Start with facts and statistics about upper limb motor deficiency (in young and old), (Doyle *et al.*, 2010)e.g, how common it is, NHS, What can cause it, e.g cerebral palsy (Piggott, Wagner and Ziat, 2016; Poitras *et al.*, 2021)
  + How does sensory motor deficiency impact individuals’ daily lives and why the recovery process is important e.g trying to type with cold hands, hemiparetic
  + how accessible is treatment to patients, the quality and speed of recovery
  + what current rehabilitation process is (Stockley *et al.*, 2019; Toh, Chia and Fong, 2022)
    - include why patients may not perform the necessary rehabilitation exercises which may include engagement or accessibility or funding
  + Science behind it, (Daly and Ruff, 2007; Langhorne, Coupar and Pollock, 2009) neurologically. How current rehabilitation can help patients redevelop their control and previous evidence for rehab (Sensinger and Dosen, 2020)
    - [Virtual Reality for Individuals Affected by Stroke - Physiopedia (physio-pedia.com)](https://www.physio-pedia.com/Virtual_Reality_for_Individuals_Affected_by_Stroke?utm_source=physiopedia&utm_medium=related_articles&utm_campaign=ongoing_internal)
    - Talk about the sensory side of motor rehabilitation
    - Include a figure showing how haptic feedback can induce neurological recovery
  + Give examples of current successful and unsuccessful use of virtual reality and haptics for rehabilitation
    - Successful (Turolla *et al.*, 2013; Yeh *et al.*, 2017)
    - Unsuccessful (Maris *et al.*, 2018), in VR, but there are advantages (Laver *et al.*, 2017) [Virtual Reality for Individuals Affected by Stroke - Physiopedia (physio-pedia.com)](https://www.physio-pedia.com/Virtual_Reality_for_Individuals_Affected_by_Stroke?utm_source=physiopedia&utm_medium=related_articles&utm_campaign=ongoing_internal)
    - A review of motor recovery after stroke (Langhorne, Coupar and Pollock, 2009)
  + Conclude with the motivation for using haptics and VR for upper-limb rehabilitation
  + Why upperlimb impairment treatment is complex, think of why my system can deal with this (Raghavan, 2015)
* Talking about unity: (Yeh *et al.*, 2017)
* Idea 1: Previous use of force feedback for upper limb motor control rehabilitation (Xu *et al.*, 2020) OR previous use of haptic feedback for …
  + Findings
  + Knowledge gap
  + Include a figure to show how sensory/haptic/force feedback induces neurological recovery
* Idea 2: Use of virtual reality to create an immersive rehabilitation environment
  + Findings
  + knowledge gap
* Idea 3:
  + Findings
  + Knowledge gap
* Summary of knowledge gaps and how my work will address it (briefly)