

Project Scope - Head Armor Pro

This project aims to reduce the risk of concussions in youth football by creating **Head Armor Pro**, a helmet accessory that combines auxetic foam padding and integrated impact monitoring. The device seeks to set a new standard for youth sports safety while maintaining affordability and accessibility.

Key Goals

The primary requirement for this project is to create a helmet material that significantly reduces the risk of concussions in youth football. This requires effective mitigation of both linear and rotational forces, which are key contributors to traumatic brain injuries (Rowson et al., 2012). Customers, including youth athletes, parents, helmet manufacturers, and healthcare providers, prioritize safety, comfort, durability, and affordability. Safety is the most critical factor, as the primary goal is to prevent injuries. Comfort and durability are essential for usability during regular gameplay, and affordability ensures accessibility for schools and youth leagues. Compliance with regulatory standards, such as those set by the National Operating Committee on Standards for Athletic Equipment (NOCSAE), is non-negotiable to validate the material's performance and safety for youth players (USA Football, 2023).

Primary and Secondary Market

The primary market for this project would be youth football players. The youth football market comprises over 1 million players in the U.S., representing a growing demand for advanced protective gear. The Head Armor Pro targets a total addressable market (TAM) of approximately \$150 million annually, with projections showing continued growth in the sports safety industry. By reducing injury risks and enabling proactive concussion management, the device not only protects athletes but also reduces long-term healthcare costs. This leads to the

secondary market not only being parents and coaches of youth players, but also doctors, athletic trainers, and youth athletes outside of football.

Assumptions

The following assumptions align with the design group's goals within the project rather than focusing solely on assumptions about the device. These assumptions will aid in the design process.

Since the group is not working with a single sponsor, team members will consult faculty and external resources to understand the requirements for a head injury-focused device. The team aims to deliver a finished project while gaining a deeper understanding of concussions and the efficiency of decelerating the brain during impacts. It should be clear that the goal is to help reduce concussions in youth sports within the allotted time and resources, not to solve the problem of concussions entirely.

Stakeholders

The primary stakeholders include youth athletes and their families, who are directly impacted by the effectiveness of helmet designs in reducing concussion risks. Helmet manufacturers, such as Riddell, Schutt, and Xenith, would benefit from integrating this technology into their products to meet increasing safety demands. Healthcare providers play an essential role in concussion prevention and management by diagnosing and treating head injuries and advocating for better protective equipment (Halstead et al., 2018). Regulatory bodies, such as the National Operating Committee on Standards for Athletic Equipment (NOCSAE), are also crucial stakeholders, as they establish safety benchmarks for validating new helmet designs (USA Football, 2023).