

# Concussion Rehab

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## *Challenge Problem and Resources*



### **Developed by:**

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Gaming Research Integration for Learning Laboratory™ (GRILL™)  
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## 1. CHALLENGE PROBLEM: CONCUSSION REHAB

The most common type of a traumatic brain injury is the threat of a concussion, which is a serious issue for many athletes, elderly people, and motor accident victims. Despite how often this injury occurs, the internal mechanics of the injury are relatively unknown. The effects of a concussion have been known to last anywhere from minutes to months. Repeated incidents can lead to permanent disabilities and even death. Due to these dangers, the diagnosis, rehabilitation, and monitoring of the recovery stages are of major importance.

As mysterious as the brain itself, neuroplasticity is the phenomena in which the brain physically reorganizes itself to adapt to the challenges of its environment. This is the major recovery mechanism by which the brain regains ability after traumatic events. The common metaphor is that of a major bridge that gets destroyed. After the destruction of the main path, traffic reroutes through the available rural roads, becoming more and more efficient over time as better paths are discovered. Likewise, when a neural pathway is destroyed the brain reroutes its activity over the remaining healthy connections. Through exercise and stimulation, the brain will route more activity through those less used neural pathways and quickly become relatively efficient.

### 1.1. THE TOOLS

This challenge is a scientific venture in developing a dynamic puzzle application. The application needs to determine a baseline for the normal level of the users' cognitive abilities. Then, after a concussive incident, the program will assess the victim's impaired abilities and recommend specific puzzles that will help stimulate these damaged mental processes. The application will also create reports for users so that they can monitor their current ability levels as well as the progress they have made throughout their recovery. Once completed, the application could then be supplied to the school's athletic department for use the following year, helping athletes that sustain concussions during the next season. Suggested tools include mobile and tablet editing programs such as X-Code, Eclipse, the Android SDK packages and plug-ins, or the Kindle Development Kit.

### 1.2. THE SOLUTION

Create an interactive mobile application that determines a baseline assessment, offers users a dynamic supply of puzzles that are utilized to stimulate the affected areas of the brain and displays user progress during the recovery process.