



CASE STUDY

Use Case: Middletown High School

Report: September 2016

Middletown High School, in the heart of New York State, is home to the award-winning Middletown Athletics Department. As the news about sports injuries—especially the dangers of concussions—started to receive more media coverage, Middletown High School listened to the concerns of parents and players. After adopting the Vector MouthGuard from Athlete Intelligence, Middletown became a national leader in using new technology to monitor and manage head trauma.

PURPOSE

The focus of this Case Study is to share how Middletown High School tapped into public resources available from the STEM program to enhance both their athletic and academic sectors. Throughout this case study, readers will be provided with interviews, photos, and background elements that illustrate how Athlete Intelligence was able to empower Middletown with the tools and resources they needed to be successful. This study is designed for students, teachers, athletic staff and administrators looking to enhance their player safety protocols.

ABOUT ATHLETE INTELLIGENCE

Headquartered in Kirkland, Washington, Athlete Intelligence is a data-driven analytics company that focuses its efforts in providing a way for athletic programs to measure and manage the head-impact exposure student athletes experience during games and practices. Through an automated system, Athlete Intelligence provides daily and weekly trend Impact Event Reports, giving athletic staff the information they've never had access to previously, in order to improve athlete technique, manage head-impact exposure, and reduce the risk of injuries.

ABOUT STEM

STEM is an academic enrichment program that immerses under-represented minority and disadvantaged high school students in hands-on engineering, mathematics, design and problem-solving programs, thereby placing them on the right track for careers in technological innovation. Designed to promote student achievement and preparation for global competitiveness, STEM programs are endorsed by the Department of Education, which allocates grants, partnerships, and funding for schools that follow the program guidelines.

BACKGROUND



ABOUT MIDDLETOWN HIGH SCHOOL

Middletown High School serves 9th through 12th grade students in the School District of Middletown, in Orange County, New York, United States. Current enrollment at Middletown High School is estimated at 2,200 students. The school is classified as an inner-city district and high poverty district, with 63.6% of students registered for free or reduced lunch.

The Middletown Athletics program is founded on the principle that playing on the field is an extension of the classroom, and that participation in athletics contributes to the growth of Middletown students. The Middletown Middies—their championship football team—is unrivaled in their region.

Middletown is committed to providing its students with a quality education. Their academic and technology programs engage administrators, teachers and students in critical thinking, communication and collaboration to help improve student achievement. Middletown's use of technology is what distinguishes the district nationally, led it to membership into the elite group of the "League of Innovative Schools," and" and place it as one of the 16 national "Race to the Top" award-winners.

THE CHALLENGES

More than 3.8 million concussions occur each year. A concussion is a traumatic brain injury that alters the way the brain functions. Effects are usually temporary but can include headaches and problems with concentration, memory, balance and coordination. Concussions are common, particularly if an athlete plays a contact sport, such as football. Repetitive concussions can have long term side-effects on an athlete's mental and physical well-being.

Chronic Traumatic Encephalopathy (CTE) is progressive degenerative disease found in people who have had a severe concussions or repeated blows to the head. Some of the most common and debilitating effects include loss of memory, difficulty controlling impulsive or erratic behavior, impaired judgment, behavioral disturbances including aggression and depression, difficult with balance, and a gradual onset of dementia. CTE has been found in the brains of autopsied football and hockey players and has been assigned a motive for early retirement for several college and professional athletes.

In an effort to minimize player risk and maximize player safety and performance, Middletown teamed with Athlete Intelligence in the Spring of 2013 to beta test what would become the Vector MouthGuard. The test group consisted of different positions and ages during spring intramurals.

The Vector MouthGuard utilizes embedded microscopic technologies that accurately measure the hit location and accelerations a player's brain experiences during play. The device includes a gyroscope and proprietary ESP chip technology that broadcasts information to the sideline. Because the upper teeth are attached to the skull, sensors in the Vector MouthGuard can measure skull movement and calculate the accelerations and decelerations experienced by the brain.





Beyond capturing impact data, the information received from the Vector MouthGuard lets coaches and athletic staff identify players who are hitting and tackling improperly. These 'coachable moments' helps the player avoid future injuries, as well as improve their overall technique and performance.

THE SOLUTION

During the 2013 season, Middletown was the nation's first high school to beta test Athlete Intelligence' impact-sensing mouth guard. The Middletown Athletics program loved the concept, and saw positive results with the technology, but didn't have the resources to pay for renewing the program

Committed to finding funding, Middletown, along with Athlete Intelligence CEO Jesse Harper, met with Middletown Superintendent Kenneth Eastwood to discuss the need for the Vector MouthGuard in their school. After discussing the merits of the Vector MouthGuard, the group found that the technology had applications that qualified if for consideration in Project Lead The Way.

Founded on the belief that new technologies can have a positive effect on the lives of students, Project Lead The Way is a 501(c)(3) non-profit organization that develops STEM curricula for use by elementary, middle, and high schools.



PLTW also provides professional development training for instructors. With funding from Project Lead The Way, administrators recognized that there was an opportunity to create — a strong bridge between academic and athletic excellence.

As proposed, this new program would offer an opportunity to improve the health and safety for athletes as well as unprecedented opportunities to engage students from STEM classes in real world problem solving experiences. Engineering students would work directly with the Athlete Intelligence staff and the Middletown Athletics Department to run the Athletics Platform, run the data, and help work through common engineering and technical problems. The Athlete Intelligence team would provide in person demonstrations, Skype with the students, and provide a series of educational and informational lectures about the development of the Vector system.

ATHLETE INTELLIGENCE

On the athletic side, the program would be guided by Craig Olejniczak, Head Athletic Trainer and David Coates, the Head Athletic Director. On the academic side, the program would be facilitated by Karen Harkins and Martha Brunelle, Middletown High School STEM program instructors.



THE RESULTS

With STEM funds released, the school district went a step further to empower their students and athletes. By utilizing students from its National Academy Bio-Med program, the athletic program with to monitor each athlete's impact data and neurological conditions from the sidelines.

During games and practices, the Bio Med students work hand-in-hand with the athletic staff to help football players with their Vector MouthGuards or logged into the Athlete Intelligence platform to observe, monitor, and interpret impact data. For these select students, Faller Field isn't just a football stadium, it's a classroom. When the team is too occupied to interpret all the data in real-time, it can be uploaded to the digital cloud, so that players and coaches can view and analyze it later.



The broader impact of the Bio Med STEM program at Middletown related to

athletics, could be far reaching. Not only do STEM students benefit from hands-on experience they also help fellow students improve skills that can reduce the occurrence of serious injuries. This will undoubtedly increase participation in positive after school programs with all of the long-established health benefits accruing or as Superintendent Kenneth Eastwood said... this amounts to an "educational touchdown."

CONCLUSION

Middletown is leading the world in player safety. As a benchmark for other school districts, this program has long-term applications for athletes using wearable technology for other sports. Middletown's forward-thinking STEM curriculum helps their athletes play smarter and play safer.

TAKEAWAYS

For Educators: A guiding philosophy in education is to identify and influence positive health behaviors in children and youth, particularly as they relate to school sponsored activities. Ongoing product development and research of wearable sensor technology will provide large databases to allow the effectiveness of the data from these emerging technologies and programs like Middletown to be assessed. It provides an understanding of what is happening throughout the organization and allows leaders to take a proactive approach of head-impact monitoring.



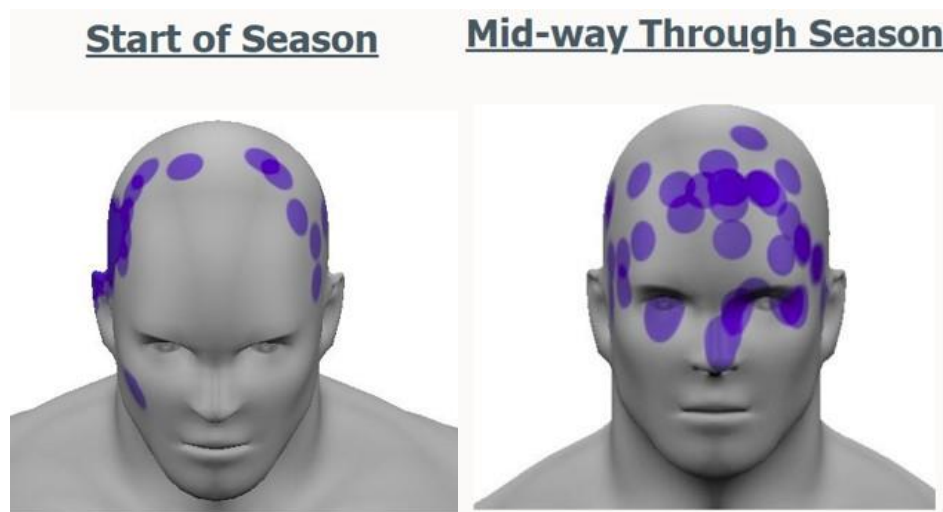
For Athletic Training Staff: The athletics staff want their players to be bigger, faster, and stronger, but they also ascribe to the same goal as the company—to also be safer. maintain the integrity and wonder of sports. The Vector MouthGuard provided real-time impact information instantly to sideline





professions allowing Athletic Training staff to intervene with athletes when appropriate for those needing sideline evaluations. It gave the Athletic Training Professionals an extra set of eyes and ears on the field for every game and every practice.

For Coaches: Each coach has a goal of teaching proper technique to their athletes and changing behavior for those using their head improperly is a key adjustment which must be made. With the Athlete Intelligences ability to highlight athletes using their head improperly, it allowed coaches to identify and track improvements over time specifically to those athletes. Coaches are also able to determine the exposure of head-impacts by day or week and identify those being overexposed, thus at a greater risk of fatigue or injury.



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