Thesis Project Portfolio

Human-Powered Vehicle

(Technical Report)

The Reciprocity of the Evolution of Sport and Technology

(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science

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In Fulfillment of the Requirements for the Degree

Bachelor of Science, School of Engineering

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Sociotechnical Synthesis

The purpose of my technical project was primarily to design a human-powered vehicle, meeting the performance specifications set out by the American Society of Mechanical Engineers for their Human Powered Vehicle Challenge. The overarching purpose of building such a vehicle was to explore how to best build a human powered vehicle, especially at a point in this technological society where well-designed human powered transportation continues to be of the more, if not most, practical forms of sustainable transportation. The purpose of my STS Research project was to understand how the improvement of technologies used in the sport of golf has served as an impetus for progress in the playing of the game, as well as how improvement in the playing of the sport has driven technology companies to modify the equipment to drive further progress in golf. The holistic purpose of this investigation is to understand how the implementation of technology plays a role in the development of sport.

In addition to meeting the guidelines already set forth for our human powered vehicle, my team's goal was to build a stable, fast, agile, and versatile human powered vehicle. The team prepared preliminary research, which was then used to make a conceptual design: a three-wheeled, recumbent, tadpole configuration constructed of AISI 4130 steel. We were able to make significant advances constructing the vehicle before the University closed. Unfortunately we were not able to make any further progress.

In sports, technology aims to make the user's life easier and therefore takes away from the quality of the athlete as they are no longer tasked with the challenge of performing a specific skill. Through my research project, I wanted to understand how advancements in sports technology have compensated for athlete's abilities, threatening to "deskill" the playing of the sport. To investigate this idea, I narrowed my perspective to the sport of golf. I investigated the evolution of golf clubs and golf balls since the inception of the game alongside the USGA and R&A's Distance Report to compare the hitting distances achieved by professional golfers over time. In summary, as the designs golf balls and golf clubs were modified to optimize hitting distances, golfers were in fact achieving greater hitting distances across the board. This very conflict of technology posing a threat to human skill is present in many sports, such as

swimming, cycling, and rowing. Sporting executives and innovators must protect the integrity of sports. Additionally, the idea of sports originating for recreation must be held to importance.

Through my Capstone project, I gained valuable knowledge of the construction of a vehicle as well as the current state of transportation globally. Through my research project, I enjoyed analyzing the role of technology in golf, which directly affects me as an avid golfer. I would like to thank Professor Smith, Professor Ferguson, and my classmates for all the help and support with these projects, especially now during these unprecedented circumstances.