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Cycle E-racing: Simulation or a New Frontier in Sports Technology?

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Abstract

Cycling-based e-racing is a growing sector of esports. Unlike more traditional forms of esports, it comprises a high level of physical exertion that is directly comparable to the activity it simulates in reality. However, as this activity has developed, it has also provided the basis for new forms of controversy. Additionally, it has provided the potential for performance enhancement that, technologically speaking, could decouple the user from how they cycle in reality compared to how they are perceived within the virtual environment. Either way, the recent development of cycle-based e-racing provides an argument that it has transcended from being a simulation of cycle racing into a new form of competitive discipline in its own right.

Keywords: Cycling, e-racing, Virtual.

Highlights

- Cycling e-racing currently demonstrates its own nuances that transcend that of merely being a cycling simulator to ultimately being a new form of cycling discipline entirely.
- This form of sport provides new forms of cheating or technological performance enhancement when compared to those seen in traditional forms of sports technology discourse.
- The scope for manipulating and optimising e-racing's equipment comprises many of the same philosophical issues and risks as the sport it is simulating.

Introduction

Cycle-based e-racing is a relatively new form of competitive endeavour. It provides a participant with the means to physically participate in the sport of cycling but when represented as a digital avatar in a simulated and virtual environment. Cycle-based e-racing is typically available utilising a range of commercial apps or digital platforms with the fundamental required equipment consisting of a computer, a static trainer with a bicycle fitted to it and an internet connection. Optional additional equipment may also include a fan for rider cooling and a gradient simulation device. An example of a rider's set-up is shown in figure 1.

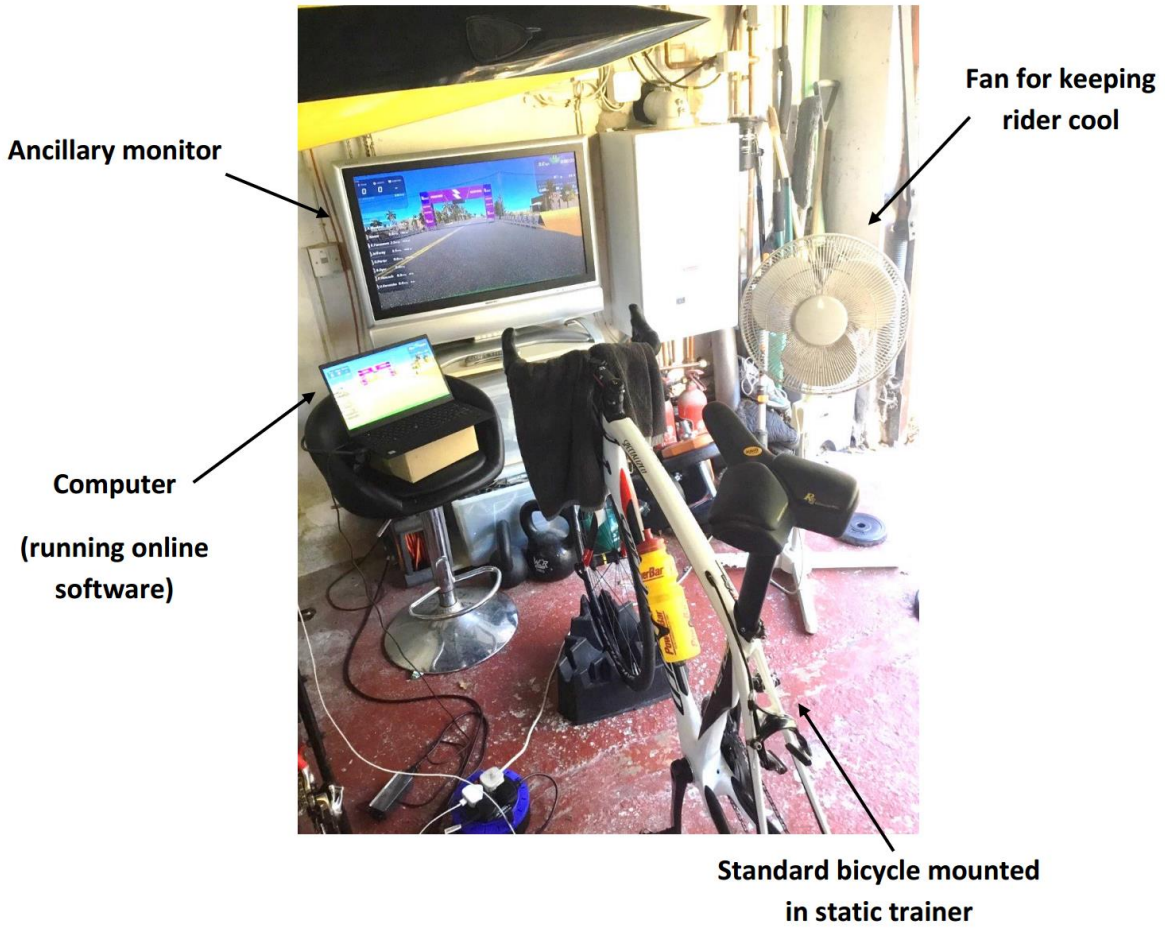

Figure 1 - Typical e-racing equipment

As an organised sport, it has gained official recognition quickly. For example, in 2020, cycling's governing body, publicly endorsed a virtual Tour de France and officially sanctioned the first Cycling Esports World Championships. As a result, the rise of cycle-based e-racing is potentially a good example of 'exergaming' (Miah, 2017, p86), confounds the attempt to separate conventional sport from esports (Parry, 2019) and could provide the most radical evolution of competitive cycling since its inception over a century ago. However, with this technological and philosophical opportunity for competitive cycling, it raises questions over what it is and what issues it can create.

New Technology But Old Problems

Whilst, e-racing is in a state of relative infancy, it has not been immune to the issues surrounding cheating as per other technologically sensitive sports (Dyer, 2015). In 2019, the

winner of the British E-racing Championships was disqualified for obtaining virtual advantageous equipment that they had not acquired correctly or fairly (Arthurs-Brennan 2019). The cyclist used a computerised 'bot' to ride on multiple occasions prior to the race at an unrealistic power, weight and durations to then gain access to the use of a favourable bicycle avatar within the app (Cyclist, 2019)

Likewise, there are frequent concerns over data manipulation in e-cycling. In essence, many current cycling e-racing platforms typically regulate or categorise a rider's performance in the virtual environment by knowing their true height, mass and power output. These metrics all dictate the virtual performance of an e-cyclist in a variety of topographical simulated scenarios but are entered by the user themselves. These require them to be honest and up to date with these values. For example, there are issues surrounding 'weight doping'. Much of the simulated physics applied in a virtual environment are governed by the power to weight ratio of a cyclist. This calculation is determined as the power they are putting out at a given moment divided by a rider's body mass. Because the platform simulates the physics of the outdoor environment, an increase in the power to weight ratio of a rider means they will ascend inclines within the simulation faster. This then provides the temptation for a rider to enter an unrealistic low body mass to allow themselves to be more competitive. Another issue with this is that it also depends on how accurate an e-racing platform requires the entered body mass to be. For example, if it only requires a rider to enter their body mass to the nearest kilogram, it does not account if the riders true mass falls somewhere between two rounded values. Day to day variability in body mass may also provide further inaccuracy. At which point, it could be argued that an e-racing cycling app indirectly encourages or coerces many riders to provide inaccurate data that conventional cycle racing could not be afflicted by. The irony of this is that it may take robust measures grounded in reality such as real time mass measurement, physiological diagnostic monitoring and formally staged competition to provide the rigour that this e-sport requires. Without formal regulation, such issues may also impede the future growth and credibility of cycle e-racing as a sport or create controversy that could negatively impact upon it (Dyer, 2015).

Simulation or New Cycling Frontier?

What is debatable is whether e-racing is an established alternative to conventional cycling or whether it could evolve to be a credible cycle sport discipline in its own right. Eysenck et al. (1982) defined a sport as an amusement, diversion, fun, pastime or game pursued for exercise or pleasure and often involving the testing of physical capabilities. Likewise, Hallmann & Giel (2018) argued that generally speaking, esports in general could not be considered sports due to their lack of physicality. However, it could be argued that both of these needs have now been achieved by cycle e-racing. Either way, it asks whether this has placed cycle e-racing as merely a simulation or instead, transcended this and become a unique cycle sport through the nuances it has. For example, due to use of the rider being ultimately static when using an e-racing app, a rider cannot independently choose to apply their brakes to improve their position on the virtual road nor incorporate any advantages of skilful bike handling. It has also been reported anecdotally that the starting effort of an e-racing cycle event involves a very large power output for 0-10 seconds to ensure a rider starts the event at maximum velocity. This is to ensure they don't lose the simulated aerodynamic draft of a group of riders. However, this is inherently different from a typical road cycling event that has to accelerate from rest – thereby requiring different physiological behaviour from that of reality. In essence, this form of e-racing has effectively both 'deskilled' and 'reskilled' a sport as summarised by Dyer (2015).

Additionally, what has also been interesting has been the introduction of gamification characteristics within cycle e-racing. For example, platforms such as 'Zwift' have incorporated 'power ups' that temporarily provide superhuman physical abilities or negate the apps simulated conventional laws of physics. These aspects are more akin to traditional games console entertainment (Miah, 2017 p.86) than traditional sport and this changes the tactical approach that a rider has when in e-racing competition. The ability to change a style of camera view also changes the athlete's approach as this provides the ability to see other avatars in a way that provides tactical insight and advantages that are not feasible in reality. Finally, virtual races remain relatively short in duration but see a far greater frequency in availability compared to traditional bike racing. It is therefore not known whether this added level of convenience will alter athlete training behaviour (and its response) or deviate it further from the traditional approach to competitive cycling.

A New Arms Race

The initial entrance to the sport itself raises issues surrounding equipment parity. This is because the type of static trainer utilised typically offer a potentially different accuracy and the inertia-based replication of when riding on a road. Furthermore, some trainers are 'smart' (in that they will automatically adjust their resistance as the gradient changes) whereas those that are 'dumb' do not. It cannot be stated whether one trainer is better or worse than the other but instead recognise that there are different virtual experiences and that tiered costs of equipment could influence competitiveness too (Dyer, 2015).

It could also be argued that e-racing diverges further away from that of a road cycling simulator if its unique equipment is tailored differently with the goal of optimising performance. For example, this could include providing assistance to a rider through the number and unique orientation of fans that would be inherently different in their volume, flow, direction, intensity and temperature from that of cycling in reality. To do so could assist in the benefit of maintaining optimal core body temperature (Wegmann et al. 2012) and perceived comfort to then reduce fatigue. Secondly, the bicycle the rider may typically use with esports may well be their normal road bicycle when held in a static trainer. However, this could be optimised in the future to position the cyclist in a riding position that maximises their physiological power production (Dorel et al. 2009) as it would not need to handle the forces, traction or exhibit the behaviour that a bicycle would need to when being raced in reality. This could mean unusual geometries or seating positions of bicycles as the importance of subsequent riding aerodynamics in cycling (Lukes et al. 2005) would no longer be relevant – even if their cycling avatar still appears on the screen showing a conventional appearance. Ultimately, an arms race could result to encourage specialist e-cyclists to yield the best performance, yet be visually undetectable within the virtual environment. Therefore, this digital arms race replicates not only the sport of cycling itself but also the criticism sometimes levelled at the influence its equipment may have on it (Zabala & Hopker, 2015).

Conclusion

The nature of competitive cycle e-racing suggests it now has the potential for technological innovation and behaviour to distinguish it from that of conventional cycle racing grounded in reality. However, it offers exponents the potential to achieve technological performance advantages grounded in the real world that may not be obvious within the virtual environment they are competing in. This e-sport has already seen situations regarding cheating that are novel in nature to those seen historically in other forms of sports that utilise technology. As a result, e-cycling will likely require formal governance and ongoing vigilance. Nonetheless, a firm case could now be made to regard e-cycling as a unique sporting discipline in its own right.

Conflicts of Interest

The author confirms that there are no conflicts of interest to declare.

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