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Zwift's Anti-Doping Policy: Is it open to Cheating?

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Abstract

Zwift is a popular interactive cycling tool (known as e-cycling) for recreational and competitive cyclists which saw a marked uptake during the COVID–19 pandemic as many cyclists were confined to indoor training due to local restrictions. In March 2020, Zwift published their anti-doping policy for cycling, and more recently an update of their rules and regulations in July 2021. Since its release in 2014, users have been cheating in the game and despite the policy coming into effect in 2020 the incidents have increased, and cheaters have been identified in both competitive and social events. This article outlines Zwift's anti-doping policy, its limitations, and how Zwift has been exploited by dopers and cheaters. Furthermore, it goes into detail into the different types of cheating, such as digital doping, controller modifications, hardware and software manipulation, and drug use. Finally, recommendations are offered for Zwift to be able to better tackle these cheaters and deter dopers.

Keywords: Zwift, Esports, Doping, Anti–Doping, Virtual Sport, WADA

Highlights:

- This paper offers a detailed analysis of the methods used to cheat, hack and dope when using Zwift, hereby creating a dopogenic environment for this esport and community.
- A comprehensive review of Zwift's anti-doping policy and its vulnerabilities to cheating and doping is provided.
- Recommendations are made for Zwift to prevent and reduce the instances of cheating and doping for their competitive and recreational player bases, in addition to advice on improving their own anti-doping policy.

Introduction and Background

Esports can be defined as an "*electronic sport*" [1] described as "*a competitive way of playing computer games within a professional setting*" [2]. However, this definition is too narrow on the wide variety of games available within the community of esports [3]. Esports are not solely based on actual physical sports, the majority are games across multiple platforms, such as computers, consoles, or mobile phones [4]. Some esport games are based on actual sports, such as FIFA for football, Madden NFL for American football, and NBA 2K for basketball [5]. E-cycling is one of the few esports that require physical exertion to play the game and its level of physical exertion is akin to road cycling [6]. The most popular e-cycling platform, Zwift [7], has not officially released how many paid subscribers they have, but have stated that they have over 3 million accounts, and had 45,000 simultaneous users cycling together on a single day in 2021 [8].

Zwift is a user interface built to replicate a virtual environment to watch your avatar cycle on screen [9]. For many, Zwift is a training tool to support their own cycling goals or fitness aspirations [10]. Different to many esports, e-cyclists require a lot of hardware and software to participate. This includes a monitor, computer, tablet or smartphone or TV to watch your avatar and run the software, a heart rate monitor (required for many competitions), a bicycle mounted to a trainer, or a dedicated cycle ergometer, which communicate the power the user is producing to Zwift via Bluetooth or ANT+.

The governing body for cycling, the Union Cycliste Internationale (UCI), provides oversight for in-person racing and competitions, and also sanctions some e-racing. For sanctioned races there need to be two sources to measure power output (e.g., the trainer and a power meter). Optional extras exist such as having a device that is placed under the front wheel to mimic the riders' steering and/or to simulate climbs. Other additions include rocker plates under the bike and trainer to allow swaying movements similar to outdoor cycling, fans, water and food stations/ desks, and music systems [9]. The cheapest and most basic setup is attaching a speedometer to the rear wheel that transmits the speed via Bluetooth or ANT+. However, this is very inaccurate and will not allow users to compete in races, as power meter and heart rate readings are required for this. Most users transmit the power they produce in watts, either from a crank or pedal-based power meter, or built-in to a so-called 'smart trainer'. Typically, the rear wheel is removed, and the bike is mounted on the trainer to a dedicated cassette using the bicycle's own chain.

A trainer/smart bike can alter the resistance the rider needs to overcome based on their location on a virtual course. As the virtual gradient increases the resistance also increases to simulate the correct resistance a rider would face riding it in real life. This effect can also be felt while riding behind another avatar to replicate the drafting effect and allows the rider to freewheel downhill while a motor turns the flywheel. Some trainers are also able to simulate riding over different terrains (e.g., cobblestone). These are predominantly direct drive trainers where the rear wheel is removed as shown in figure 1 below, or in the form of a smart bike. "Dumb" trainers are unable to adapt resistance based on the in-game environment, although they may be able to transmit power data, but the rider must manually control the resistance [9].

Figure 1 - Below displays a typical set up for Zwifting. The cassette attached to the trainer is connected directly to the bike drivetrain, with the removal of the rear wheel and Zwift running via an iPad and TV screen.

Pivoting back to the origins of e-cycling we look at the history of cycling as a sport. Cycling has been a competitive sport since 1868 and has been attracting participants of all levels and abilities ever since [11 & 12]. Arguably one of the most popular sporting events around the world is the Tour De France, which has 3.5 billion television viewers and 12 million roadside spectators annually [13]. The Tour de France tests cyclists against difficult climbs and arduous terrain over 21 days. Elite cycling is extremely demanding, and therefore has a long history of cheating and doping - those who use performance enhancing drugs (PEDs) [14]. One of the best-known examples of the dangers of doping was when Tom Simpson died in 1967 when ascending Mont Ventoux on a very hot day during the Tour de France. Simpson was later found to be under the influence of amphetamines and alcohol, which allowed him to push beyond his limits and ultimately caused heart failure from heat exhaustion [15]. In recent times, Lance Armstrong [16] and the US Postal Team / Discovery Channel team led the most sophisticated doping program ever seen in cycling to help them win 7 Tour De France titles from 1999-2005 [17]. Armstrong was stripped of his titles after a confession in 2010 that he used multiple PEDs, such as steroids and EPO (erythropoietin; red blood cell booster) following a whistle-blower case originated by Floyd Landis, a former teammate [18 & 19].

Although doping in cycling has been fought heavily in recent years with more frequent and sophisticated tests. When Zwift was launched, there were initially no anti-doping or anti-cheating measures. There was no way of predicting these issues during the creation of Zwift. Especially, since the rapid rise in its popularity during Covid-19 which has highlighted multiple instances of cheating and/or hacking. As a result, doping and/or cheating cases have frequently affected the outcome of their events [20] and other sedentary esport games. Instead of the more common PEDs such as

anabolic steroids [21] or blood doping [22], amphetamines (such as Adderall) are the drug of choice among gamers [23]. These allow e–athletes [24] (or esport competitors) to stay focused for much longer during video game play. In the first-person shooter (FPS) genre of games, the popular esport game called "Counter-Strike: Global Offensive" (CS:GO) [25] included a player called Korey from team Cloud9 [26], and his team all confessed to having taken Adderall before a tournament [27]. In another esport called "Defence of the Ancients 2" (DotA 2) [28], a coach called Timur Kulmuhambetov made a statement about OG (an esport team) [29] openly admitting doping (i.e., using Adderall) to gain an advantage during competitions [30].

With the rise of esports and doping evolving to fill the gaming sector, this has led to the creation of another form of doping called "e–doping" which refers to "*using hacks and cheats to gain an unfair advantage in the [electronic] game over other players*" [31]. E–doping can also be referred to as robo-doping [32], or more commonly as digital doping [33]. E–doping and digital doping are different because digital doping also covers hardware editing to manipulate the game software or physical equipment such as a bike in addition to hacks and cheats in-game [33 & 34].

In 2020 the UCI launched the inaugural UCI Cycling Esports World Championships [35]. At this event 53 females and 77 males competed on Zwift to determine who would be crowned world champion in the virtual world. Since then, the British E–Cycling championships were also held, but the winner Cameron Jeffers was disqualified post-race. Jeffers had used a bot to unlock a bike called the Zwift Concept Z1 or "Tron bike" from the movie "Tron" (so-called due to the similarities in appearance) [36]. The 'Tron' bike is an upgraded version of the typical bike available in Zwift and is significantly faster for the same power, saving 53 seconds over a ~1hour flat ride [36]. Jeffers did not cheat in the race itself but unlocked the bike pre-race. Zwift found out that he did not physically cycle the required 50,000m of ascent needed to unlock the bike but used an ANT+ simulator bot to ride on multiple occasions at 2000 watts for distances of 200km with a weight of 45kg [37 & 38]. Jeffers claims not to have been aware that this was against the rules and pointed out that this 'cheat' was offered to him from an outside person, which he accepted.

We will now demonstrate and show the current examples of cheating and doping within e-cycling as evidence to highlight how Zwift is currently vulnerable. Then we will review their current anti–doping policy which unknowingly promotes a dopogenic environment.

Doping and Anti–Doping

Doping can be defined by the World Anti-Doping Agency (WADA) as, "*the occurrence of one or more of the antidoping rule violations set forth in Article 2.1 through Article 2.11 of the Code*" [39]. WADA is the worldwide governing body that covers all sports to ensure it is clean and fair and tests athletes for cheating at major sporting events [39]. Table 1 summarizes the multiple anti-doping rule violations (ADRVs) which can be classed as doping and/or cheating.

Table 1 – Summary of WADA Doping and/or Cheating Rule Violations [39]

A) Presence of a prohibited substance in athlete's sample
B) Use or attempted use of a prohibited substance or prohibited method
C) Evading or refusing or failing to submit a sample
D) Whereabouts failures
E) Tampering or attempted tampering with any part of the doping control

F) Possession of a prohibited substance
G) Trafficking or attempted trafficking of a prohibited substance
H) Administration or attempted administration of a prohibited substance in or out of competition
I) Complicity or attempted complicity
J) Prohibited association with another athlete or coach
K) Acts to discourage the reporting to the authorities (e.g., intimidating other athletes/coaches)

Subsequently, there are many factors and influences that allow doping to occur. Work by Backhouse and colleagues [40] looked at the "dopogenic environment". They define it as, "*the sum of influences produced by the surroundings, opportunities and conditions that promote ADRVs. Local level factors (e.g., team, sports clubs, home, neighbourhood, school) work alongside structural factors (e.g., education systems, national and international sport organisations, health systems, government policies and societal attitudes and beliefs) to create the 'dopogenic' milieu"* [40].

The various methods of cheating within Zwift shall now be explored and discussed which link back to a dopogenic environment being created both in-game and in reality. From here the policy will be reviewed, and critically analysed with recommendations from the authors.

Methods of Cheating in Zwift

Anthropometric Manipulation (Height/Weight Doping)

One of the most common ways of cheating in Zwift is by altering your body mass (known in Zwift as weight) and height. Inaccurate height reporting is less common, but the Zwift avatar does ride and corner differently for a smaller and taller rider due to differences in the avatar's drag coefficient [41]. Although these numbers aren't officially available from Zwift, tests have shown that decreasing height by 15cm saves the rider 5-10watts, or almost 2 minutes for one hour of flat riding [41]. Weight manipulation has an even greater effect, especially on hilly courses [42]. When completing Alpe du Zwift (one of the longest climbs in Zwift) an 82kg rider producing 300 watts will take 54min 49s (13.49kph) to ascend, whereas a 75kg rider producing 300 watts will take almost 5 minutes less, only needing 49min 31s (14.8kph). Over two circuits of the flattest course, Tempus Fugit, the 75kg rider producing 300 watts will still be 51 seconds faster. For official races governed by the UCI or British Cycling, riders need to submit a video showing them measuring their height and weight within 24h of a race. This includes proof of scale calibration and a time stamp to attempt to verify authenticity [43].

Gender Doping

The authors define 'gender doping' as, an individual changing their gender identity, in the pursuit of athletic success in sport (or within an event) over another gender (mainly a male to a female). This is due to the lack of rules and regulations to support and protect transgender athletes who are in the process of transitioning (or ensure fair play among cisgender competitors), but, without the proper legal and rule framework, this can be potentially exploited as a competitive loophole.

There is evidence to demonstrate that this has already occurred in some Zwift events [44 & 45] where males have competed as females to win races. There may be a need to create a third category just for athletes who are transgender to create a level playing field [46]. There has been recent evidence-based research that transfemales have significant physiological advantages over their cisfemale counterparts in a range of sporting disciplines [47 – 49]. Transgender cyclist Jillian Bearden [50] was asked to leave Team Fearless (a female cycling team) because she was not categorised as a "biological female". There is a limit to the frequency of times you can change your gender in Zwift, and if you change your gender more than twice in a month your account is flagged. Nevertheless, it could be a specific event a rider wants to compete in, and/or they have a wife or daughter who wants to race. We propose that there needs to be an official way to verify one's gender; this could be through a government issued photographic identification card and/or with an official birth certificate.

Using Banned Substances

Athletes may choose to dope in various ways, which may be in the form of blood doping, either as blood transfusions [22] and/or the use of Erythropoietin (EPO) [51] to boost aerobic endurance. Another category of doping that may be used are stimulants, which includes pseudoephedrine and amphetamines to provide the central nervous system stimulation and can increase sporting performance [52 & 53]. The issue is that it is very difficult to monitor and catch athletes performing this type of doping. To accurately catch cyclists who dope with banned substances you must set up an athlete biological passport (ABP) to build a detailed blood and hormone profile [54]. If there is an abnormal blood reading, then it should be tested to either prove if it is normal biological fluctuation or manipulation [55]. However, the issue with this method is that there will be a time delay in catching athletes [56 & 57]. The use of any form of banned substance breaks ADRVs A, B, F and H (Table 1) on an individual level. It can also include ADRVs I and K (Table 1) if within a team environment.

Sandbagging

Sandbagging is a term used for someone who competes in categories below their ability to gain an unfair advantage in races. Zwift races are split into A, B, C & D categories based on a rider's functional threshold power (FTP) and weight. Zwift collects this data and displays it, so riders can enter the correct categories according to watts produced per kilogram of body mass (w/kg).

- **A:** 4.0 w/kg or higher
- **B:** 3.2-3.9 w/kg
- **C:** 2.5-3.1 w/kg
- **D:** 2.4 w/kg and below

Zwift has a function that alerts a rider if they are entering a competition that is too easy for them. If they persist, their avatar will have a cone ('cone of shame') over their avatar indicating to others that this rider is better than they claim, and Zwift will throttle their power [58]. It is possible for riders to enter their FTP manually to a lower score, but Zwift will automatically update this based on workout or race data. However, following this automatic adjustment it is then possible to manually reduce this number again if desired. Only if a rider is signed up for the website ZwiftPower.com (a former 3rd party website to display race results and data, now owned by Zwift) would a rider manipulating his / her data in this way be removed from the results for exceeding the

w/kg boundary for a lower category. One does not have to sign up to ZwiftPower, but if one wants to race in a series, this will be governed by ZwiftPower and the individual will have to sign up. The category for the rider is determined by averaging the w/kg and FTP from the best 3 races in the last 90 days, and thus makes manual data manipulation impossible [59].

Power Manipulation (Unusual Pedalling Styles)

With certain power meters riders can manipulate the power data on Zwift by using a technique known as 'sticky watts'. This involves pedalling at a high-power output for a few seconds, then coasting for a few seconds, and Zwift will display a constant high-power output despite the lack of input. This is believed to occur due to Zwift compensating for assumed power dropouts between the power meter and Zwift by maintaining the last power data sent before a zero watt (i.e., 0w) reading for a few seconds [60]. This can be observed afterwards by comparing the power files from Zwift to the power files taken from a head unit connected to the power meter [61]. The exploitation of this technique is prohibited under the 'unusual pedalling styles' section of the latest Zwift esports rules and regulations [43].

Power and Controller Manipulation (Data Fabrication and Modification)

Since the update of the rules in July 2021, riders in Zwift esports events are required to use both an authorised model of direct drive trainer (manufacturer claimed accuracy +/- 2%) and another method of measuring power, along with heart rate recordings, to compete. However, some individuals have either created software and/or modified hardware (such as an Xbox controller) to be connected to the Zwift program instead of using the indoor bike. Brad Dixion gave a lecture in 2017 showcasing how to cheat using USB hacks [62]. He said, "*the point of the data hack, then, was to reveal a chink in e-racing's rather flimsy armour. We're not picking on Zwift particularly here. If you look at virtual cycling across the board, it's a pretty soft target for hacking*" [62]. One user even showed others how to do it using an old USB Nintendo controller [62] laying out the steps and prices. Other potential ways to influence in-game power outputs include changing the trainer calibration settings by altering the flywheel speed during the spin down procedure. Although, this may be noticed by competitors during in-person events and might be detected by trainer software. Identifying this type of calibration manipulation would be difficult to police at home and in social events.

It should be said, at an in-person live Zwift event where everyone is in a room with their bikes this type of cheating cannot occur. However, someone could have an indoor bike with the correct specifications and send in a photograph of themselves with height and weight. Then when it comes to the actual cycling, they could switch over to the controller which requires considerably less physical effort than using a bike. The only way to prevent this is if all cyclists live stream or record their sessions for verification.

Zwift Anti – Doping Policy Review

On the 31st July 2021, Zwift updated its Cycling Esports Rules and Regulations to version 1.0.7 [43] and have attempted to address some of the above raised issues from the original policy document [63]. The changes are related to in-game cheating and not doping. It is important to note that these rules only apply to designated high-level events, and not all Zwift Racing. Table 2 provides a summary of these rules and regulation changes.

Table 2 – Summary of Zwift's Cycling Esports Rules and Regulation Changes, Version 1.0.7 [43]

A) Clarified minimum age for events.
B) Smart trainers/smart bikes must have manufacturer claim of power accuracy of at least +/- 2% and make and model must be authorised by Zwift.
C) Equipment and techniques not permitted or effective in in real life (IRL) cycling sport are prohibited.
D) Rules applicable in IRL events of a particular format shall be applicable to Zwift Cycling Esports version of that event format.
E) Revised performance verification process.
F) Pre-race test data must be submitted at least 14 days before the event.
G) Updated pre-race test course instructions.

Of these updates, the rules surrounding the trainers and smart bikes are likely to have the biggest impact as this rule excludes older trainers from major manufacturers. They now will prohibit the use of certain trainers if they no longer offer customer support and software or firmware updates. Zwift specified their new rules are not intended to prevent innovation, but to avoid the exploitation of 'non-sporting' loopholes. There is no industry standard or major third-party testing to verify the +/- 2% requirement of trainer accuracy, which leads to potential opportunities for manufacturers to fabricate trainer data to boost sales; thus +/- 2% remains undefined.

Next, we shall look at the purpose of the policy. It states it is to: (a) protect the health and safety of riders; and (b) ensure fairness and integrity to all Zwift cycling esports events and series. It is the opinion of the authors that the Zwift policy fails to uphold these two objectives. Tackling each of these points the evidence will be laid out to highlight the failings of these objectives.

Failure to Protect Athletes Health and Safety

The evidence supplied in the above methods of cheating section displays the growing risk to athlete's health and safety. Furthermore, it can be exploited by dopers due to lack of significant rules to enforce their current anti–doping policy. In total, there are four ADRV's that can be breached individually (A, B, F and H) and a further two within a team environment (I and K) (please see Table 1 for all ADRVs).

The lack of oversight shows little thought and scrutiny to ensure dopers do not get the opportunity to cheat. If there is an underground culture of doping in Zwift, then it may lead to injury and/or death of one or more athletes. Within cycling there have already been cases of cyclists being severely affected by their doping behaviours with some even leading to an early death [64]. Section 8 of the Zwift policy states, "*The commission may remove Prohibited Substances and Prohibited Methods from the Prohibited List at its sole discretion*" [63]. The following is of extreme significance as it can be interpreted in a way that the Zwift committee can choose to ignore certain drugs and/or metabolites that may appear in a test sample. Alternatively, it may ignore or discredit the prohibited list if a certain drug appearing among their cycling testing pool. Furthermore, this undermines any notion of fostering an anti-doping culture within Zwift when their committee ignores WADA's own banned substance list. Conventionally, no single sport's governing body would pick and choose what is and what isn't on the banned list, only WADA can [65]. Especially since Zwift events run by the UCI are under the WADA signatories [66].

Subsequently, WADA has received a signatory from the International Esports Federation (IESF), which has adopted the WADA code for anti-doping rules and regulations [66 - 67]. With both the UCI and ISEF supporting WADA and its mission for clean sport, it is not clear why Zwift would then deviate from this, especially since indoor cycling is akin to outdoor cycling's physical demands. Zwift should therefore rectify this by adopting the full WADA anti-doping policy just as the UCI and ISEF have done.

Failure to ensure Safety, Fairness and Integrity

The evidence supplied in this paper's methods of cheating section displays the risk of breaching safety, fairness, and integrity for Zwift (especially in reference to the digital doping examples). There are some discrepancies between the Zwift's anti–doping Policy document [63] and the Cycling Esports Rules and Regulations [43] document. Within the Zwift policy document there is a two-strike policy which shows that if you are caught for the first time breaching any of the ADRV's you are suspended for a year (section 14.2). If you are caught again (section 14.2), you receive a lifetime ban. Reviewing the Cycling Rules document, they appear to underplay the seriousness of cheating and digital doping within Zwift when compared to Zwift's own anti–doping policy. Tier 1 covers actions with no intent to gain an advantage, such as incorrectly calibrated equipment with punishments ranging from the rider not being permitted to start or their results annulled. However, within the Zwift anti-doping document they state (section 6.1.a), "*It is each Rider's duty to ensure that no Prohibited Substance enters their body. Riders are responsible for any Prohibited Substance, or its Metabolites or Markers found to be present in their Samples*" [63]. This is strict liability [67], even if an athlete doesn't intend to dope, they are still liable for any banned substances or their metabolites and will receive sanctions accordingly.

The Cycling Rules document is ineffective as people can easily manipulate data to go faster. It is questionable why there is no case for inadvertent digital doping with no punishment. Athletes either did or did not cheat, and there has to be strict liability when it comes to both the physical and the technological rules. Tier 2 violations are those with a deliberate intent to gain an advantage, such as height/weight manipulation or exploiting bugs for performance gain. These violations are punishable by a disqualification from the event or series for a first violation, and up to a one-year ban from Zwift esports events for a third violation. Finally, Tier 3 violations are those that bring the sport into disrepute, which cover fabrication or modification of data and use of bots/simulated riders. These are punishable with bans ranging from six months to a lifetime for a third violation.

Both tier 2 and 3 bring the sport into disrepute as they are deliberately affecting the event in a negative way with the intention to cheat. There needs to be a two-strike policy for digital doping in the same way as for substance doping so that both policies match up and there is no grey area. Currently all riders listed on the Zwift sanctioned riders list have committed tier 3 violations, with all three issued 6-month bans in January 2021. In the case of Selma Trommer [68], this ban was increased by a further 12 months when it became apparent her data manipulation was more widespread than initially understood. This was compounded by the fact that she attempted to verify her performance and used file editing software within 2 minutes of completing her ride to attempt to verify her previously questionable power data. This is the first instance where a ban will prevent a rider from racing over the traditional winter e-cycling period. The other riders banned were eligible to race again starting summer 2021.

Still under safety, fairness and integrity is the issue around the total frequency of testing throughout a competition year. Frequency of testing is important as athletes can have a washout period to hide their elevated hormone levels from doping or use masking agents to cover them up [70]. Zwift states they currently conduct both in-competition and out-of-competition testing at virtual events and/or live events [63]. With the rapid climb of e-cycling popularity on Zwift it begs two questions.

A) Can Zwift fund their anti–doping program effectively to tackle or at the very least deter dopers?
B) Can Zwift test 5-10% of their top competitor base to ensure fair play for all athletes?

The answers to these questions will ultimately dictate what Zwift can and cannot do within their financial means to keep their sport clean. To help Zwift keep their sport clean from dopers and e-dopers we recommend the following revisions to strengthen their anti-doping policy.

Despite all of this, there will be a small portion of those caught cheating who do inadvertently cheat without knowing. These may be riders who are using incorrect software and or mis-calibrated bikes. However, this is in the minority as everyone has been shown the rules, regulations and are aware of what equipment they need to race at a high level and to verify their race data authentically. To help ensure fair racing and protect those who may face some form of software and or hardware malfunction, a Zwift appeals system should be in place to allow professional riders to defend themselves and be given the benefit of doubt to race until proven they are actively cheating the game. If there is a frequent recurrence of cheating at the lower levels of racing within Zwift, then the relevant committee from Zwift should investigate and deliver sanctions as required.

Recommendations to Zwift to counter Doping and Digital Doping

a) Remove doping tests that are not at a sanctioned Zwift or UCI event (physical location). All drug testing should be for competitive cyclists that have signed agreements with their teams, countries, and Zwift. In turn, this will also save Zwift money that can be better used for testing their pool of elite athletes.

b) After reviewing all the previous methods of cheating commentary we provided, it is clear there needs to be a new set of anti-doping rule violations specific to Zwift. The authors call for the creation of a “Digital Doping Rule Violations” (DDRVs) that are for Zwift and enforced by the officials and complied to by the cycling community. These DDRVs will help tackle data manipulation, software hacking and illegal hardware use for on their bikes, their Zwift (or computer) software and lastly, in-game when racing. The DDRVs will also update and improve the current three tier ban system that Zwift have just published [43].

c) Seek approval from the International Olympic Committee (IOC) to allow anti-doping Zwift cases to be heard in the Court of Arbitration for Sport (CAS) [71]. Stivers [72] points out that the IOC refers all athletes with anti-doping issues to CAS for resolution [71]. CAS is the expert forum to debate and rule on these matters. Nonetheless, CAS only accepts (at this present time) cases that are classed as “sports” and may choose not to convene for an esport. However, Zwift may be the one exception to this ruling as it is a physically demanding esport with a structured competitive layout with local to international events backed by the UCI. It would be a significant endorsement for the sport if the IOC encouraged CAS to support Zwift’s Anti–Doping Policy.

d) Include the option to dual record from both a power meter and trainer in-game perspectives. That way, any incorrect calibration values and discrepancies are immediately visible, and this will save Zwift considerable time when investigating potential cases of cheating as the data will be immediately available. If it is measured live, there would then be no opportunities for riders to perform verification tests and quickly use software to manipulate power data before sending it to Zwift, as in the case of Trommer [69].

e) Finally, Zwift should adopt the full WADA anti-doping code. That mirrors what both the ISEF and the UCI have been doing to promote clean sport in their respective events. This would also send a clearer message to those who would cheat in Zwift and help deter dopers. In addition, it would strengthen the community of Zwift and help foster an anti-doping culture.

Conclusion

In conclusion, the current Zwift policy needs major revisions and adaptations to not only promote a level playing field for its members, but it must also make these changes to remove the structures and facilitators that enable doping at the elite level. In turn, this will inhibit the structures and facilitators that have created the dopogenic environment within the Zwift community at all levels. Regardless, in the current climate there is no evidence to support an epidemic of riders doping through PEDs. However, there are a plethora of instances of riders fabricating data to cheat in-game through digital means. Of note, Zwift could not have predicted these issues when developing the game and despite these cases they are somewhat actively trying to clamp down on cheating and hacking in game. Zwift is entering into new territory and facing new challenges that require policy revisions that have never occurred before. This report can be used as a reference for policy recommendation to help Zwift in being a proactive governing body to tackle doping, cheating and promoting safe e-cycling.

Conflicts of Interest and Source of Funding

The authors confirm that there is no conflict of interest to declare.

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