

Technology in Sport: Three Ideal-Typical Views and Their Implications

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This paper examines various kinds of sport technology from the perspective of three normative theories of competitive sport. Sport technology represents a certain type of means to realize human interests and goals in sport. Such technology ranges from body techniques, via traditional sport equipment used by athletes within competition, to performance-enhancing machines, substances, and methods used outside of the competitive setting. Any critical and systematic discussion of sport technology in competitive sport should relate to some kind of interpretation of the main constituent of these practices: athletic performance. The paper discusses three ideal-typical theories in this respect. The first possibility presented is the so-called non-theory. As the term indicates, the non-theory is no real theory of performance. Rather, it is a theory of how sport can serve as a means towards external goals such as prestige and profit. In technological terms, the non-theory is relativistic; it accepts any kind of sport technology as long as it serves as a means to reach external goals. The second theory of performance is the thin theory. The thin theory builds on a particular sport ideal: CITIUS, ALTIUS, FORTIUS. Sport is considered an arena for the testing out of the performance potential of the human body. To end up with valid and reliable tests, performance measurements have to be accurate, and the thin theory requires equal opportunity in competitions. The implication for technology is increased demand on standardization. However, the thin theory implies no regulation outside of competition. An acceptable technology is simply a performance-enhancing technology. A third, thick theory of performance does not just require equality of opportunity; its basic premise is that sport should be an arena for moral values and for human self-development and flourishing. Technology that requires athletic efforts and skills, to which there is equal access, and that

does not represent unnecessary risk for harm, is considered not merely as acceptable but as constitutive to the value in sport. Expert-administrated technology that enhances performance without athletic effort or which exposes athletes to the risk of harm is problematic and should be avoided. In a final, critical comparison, it is argued that the thick theory represents the only possibility towards a sound ethics of technology in sport.

Introduction

Technology serves many functions in sport. It has a constituent function. Without ball and bats, there is no baseball. Without the bike, bicycling races are impossible. Technology might enhance performances, such as the new Fastskin swimsuit that is said to reduce water friction, or the new alpine carving skis that seem to help beginners master more easily the basic techniques of the sport. Other kinds of technology, such as helmets and body protection in boxing and ice hockey, are supposed to prevent injuries. The possible use of video cameras in the refereeing of soccer matches is thought to enhance justice.

It is no wonder, then, that sports communities regularly engage in controversies over technological development, implementation and use. Does the Fastskin suit change the nature of swimming by reducing skin contact with the water (as some critics claim), or does it develop swimming to a higher level of human performance as its proponents argue? Should one allow video refereeing in soccer, or would this reduce 'the human touch' of the sport and make it more mechanistic and less entertaining? Should professional boxers do as the amateurs and fight with helmets, or is the risk for serious head injury one of the key challenges of the sport?

In this article, I will suggest a framework for critical and systematic normative discussion of the many kinds of technology and their roles and consequences in sport. First, building upon a general understanding of the concept of technology, I provide a more specific interpretation of sport technology. At the core of this interpretation lies the idea of technology as an expression of human interests and goals. Second, I discuss three ideal-typical views on the interests and goals of sport and examine their implications for technology. I conclude by sketching an approach to a sound understanding of, and dealing with, sport technology in the future.

Sport Technology

The concept of technology is itself somewhat ambiguous and has been analyzed from various philosophical perspectives. Some, such as Ihde (9), are concerned with the nature of technology or the phenomenon of "technology 'in itself'", so to speak. Ellul (6, p. xxv) understands technology in a wide, almost all-expanding manner as "the totality of methods

rationally arrived at and having absolute efficiency for a given stage of development in every field of human activity".

A more narrow approach corresponds to a larger extent to the use of the term in ordinary language. Dictionary definitions refer to 'technology' as "all the means designed by a social group to provide for material comforts." Tiles and Oberdieck (23, p. 5) make this common sense understanding more specific when they talk of "material devices designed and manufactured to make existing human activities easier or to make possible activities which people have dreamt of engaging in but to which they are not biologically adapted".

Typically, technology refers to tools and equipment ranging from the simple hammer and nail to advanced computers, aircraft, and spacecraft. Technology is understood as *human-made means* to reach *human interests and goals*. This understanding seems to be the one that underlies most discussions in sport, too, and it will therefore be the one upon which I build in what follows. Sport technologies, then, are human-made means to reach human interests and goals in or related to sport. What are these goals?

As with "technology", "sport" can be understood in a wide and a narrow sense. In the wide sense, the term refers to activities ranging from jogging and non-competitive aerobics via bodybuilding to traditional competitive sport. In the more narrow and perhaps more traditional sense, "sport" refers to competitive activities in which the participants' bio-motor abilities (such as endurance, speed, and strength) and movement skills, determines the outcome. More specifically, what I have elsewhere called the structural goal of sport competitions, or the social logic of these practices, can be described as the measuring, comparison, and ranking of competitors according to athletic performance as defined by the relevant rules (12). To limit the discussion somewhat, I concentrate on competitive sport and on technologies that are designed to enhance performance, since these have generated the greatest controversies in recent years.

Views of sport technology, then, will depend upon the interpretation of the goal it is meant to serve -- that is, the goal of sport. The structural goal of competitive sport is to evaluate and rank persons according to their athletic performance. There are, however, several interpretations or theories of what athletic performance is all about, and these theories have implications for views on sport technology. Here I concentrate on what sociologists sometimes refer to as ideal-typical views. These are not meant as precise empirical descriptions of the many and diverse views in particular persons or in sport groups of relationships between sport and technology, but as internally consistent elaborations of elements of such views. More specifically, I will discuss three ideal-typical theories of athletic performance that I consider to be rather representative of the field. In this way, I attempt to demonstrate the tensions between various positions and establish a framework for critical and systematic discussion.

The Non-theory of Athletic Performance

First, we have what can be called the non-theory of athletic performance. The non-theory label is almost self-explanatory -- there is no real interest here in any kind of theorizing about sport in general or athletic performance in particular. What counts is the status of sport as a means towards external goals. Typically, external goals are personal, political, and ideological prestige, and/or profit. The reasoning about sport for the non-theorist is purely instrumental. External goals justify any or all means. What is of interest is to what extent the outcome of a competition serves to realize external goals to the maximum extent.

Although it takes the form of an ideal-typical position, the non-theory resembles views found in totalitarian sport regimes such as the one of former East Germany, and, if common speculation is to be believed, the one of the current regime of the People's Republic of China. In fact, former East Germany had as part of its constitution that the role of sport was to demonstrate the superiority of communist over capitalist man (20). To be fair, we find similar views of athletic performance in the commercial sport entertainment industry. In this view, sport is interesting only because, and only as far as, it has commercial potential. For instance, Paul Klein of the American broadcasting agency ABC describes commercial television as "the business of selling audiences to advertisers" (4).

The consequences for views of sport technology are obvious. There is no room here for distinctions between what can be considered acceptable or unacceptable technology. Whether we are talking of improved equipment, improved training machines, or even doping and genetic technology, the dominant attitude in this position is that technologies must be ranked and pursued according to their efficiency in scoring external goals. Basically, the non-theory is a non-moral theory -- it attempts no moral evaluations of the means adopted to secure winning and the external goals that go with it.

The Thin Theory of Athletic Performance

In contradistinction to the non-theory, the thin theory is a theory of the value of sport. The very core idea here is that sport is driven by metaphors and symbols of "transcendence" and "progress". The paradigmatic case of progress is record setting. To the thin theorist, key questions are as follows: What, in objective terms, is the human organism capable of performing? How fast is it possible to run 100 meters? How high can a human being jump?

The thin theory is an expression of what I have elsewhere elaborated as the logic of quantitative growth (12). It has philosophical roots in a tradition of technological optimism in which technology is considered as having the potential of liberating the human spirit from nature.³ One current representative of the tradition, Marvin Minsky, talks provocatively of the human brain as a meat-machine and suggests future generations to enhance its performance by inserting microchips and other advanced technologies. The alternative, he says, is to

continue to walk around as "dressed-up chimpanzees" (3, p. 10). In a narrow interpretation of the ideology of Olympism, there is a similar quest to transcend nature. Pierre de Coubertin talked of the sport record as having the same function in Olympism as the law of gravity in Newtonian mechanics -- it was "the eternal axiom" (10). Today, views related to the thin theory can be found both among practitioners and scholars. The drug scandals of Tour de France indicates that, at least to some of the athletes, coaches, and medical doctors, doping was considered a justifiable means of performance enhancement (5, pp. 153 ff). Tamburrini (22) gives a philosophically reflective argument in favor of the legalization of doping and a positive open mindedness towards the application of genetic technology in sport.

What are the consequences of the thin theory for views on sport technology? To be able to measure progress objectively and set records, the theory requires reliable and valid measurements, comparisons and rankings of competitors according to performance. Competitions are considered analogous to scientific experiments. What Rae (18, pp. 65 ff.) calls means-regarding equal opportunities (everyone has equal access to the means required to reach the goals of the practice), are of primary importance. Valid results in sailing, skiing, and the javelin depend upon the fact that everyone is given access to identical (or at least very similar) boats, skis, and javelins. What should be tested under this theory of athletic performance relate exclusively to capacities of the human organism itself, and not to technological variables nor to the resources of the support system.

The basic thin theory norm for technology promotes standardization of equipment used to perform in competition. There should be few, or ideally no, regulations of training and performance-enhancement outside of the competitive setting. In principle, all kinds of technological innovation that can enhance performance are acceptable. As long as all competitors have equal access, innovations in performance-enhancing technologies are considered to be progressive. In fact, to the thin theorist, the same is true of out-of-competition technology: extreme diets, doping, and even genetic technology. Performance improvement is the goal that justifies all means.

The Thick Theory of Athletic Performance

The thick theory of athletic performance, by contrast, stems from different initial premises. Here, sport is considered a social practice with its own characteristic norms, values, and internal goods that again are linked to more general human virtues. Moreover, the thick theory represents an inherently normative project: The norms and values of sport ought to be respected, protected, and cultivated.

There are many versions of the thick theory. Historically, the amateur ideologies of last Century's England and the full version of Coubertin's Olympism can serve as examples. Currently, we find more critically and systematically developed theories of the values of sport

such as, for instance, those of Fraleigh (7), Simon (21), and Morgan (16). I shall outline briefly my own ideas (12) and examine their implications for sport technology.

First, as indicated by the thin theory, in order to measure, compare, and rank competitors according to performance in a meaningful way, there is a need for equality of opportunities to perform. Every competitor ought to be given access to the same performance-enhancing means. What distinguishes the thick theory from the thin theory, however, is that performance is defined not only negatively in terms of elimination of non-relevant inequalities in competition, but positively in terms of a systematic listing of the basic elements of performance. Development of athletic performance is considered a question of progress that can be measured in qualitative terms: centimeters, kilograms, or seconds. Thick theories link sport to moral ideals of human development. One of the classic ideals is expressed in Rawls' formulation of the Aristotelian principle:

Other things equal, human beings enjoy the exercise of their realized capacities (their innate or trained abilities), and this enjoyment increases the more the capacity is realized, or the greater its complexity. (19, p. 426)

From the thick theory perspective, sport ought to be an arena for human development and flourishing and one among many elements of the good life. How can a theory of athletic performance reflect this ideal?

In principle, and although they are empirically indistinguishable, we can say that an athletic performance is built on two cornerstones. As all other human phenotypes, sport performances are the complex products of interaction between genes and between genes and the environment. Genetic predispositions are the products of the genetic lottery, and here we are all different. Genetic predispositions to develop abilities and skills of relevance to sport are often referred to as sport talent. The idea of a pure talent makes sense at the moment of conception only. From this moment and onwards, there is interaction with environmental influences. An athletic performance, then, is the product of genetic predispositions to develop abilities and skills relevant to performance, and environmental influences from the very first interaction between a fertilized egg and the organism of the mother, via the first nurture and family upbringing and the general material, social-psychological, social and cultural influences, and to sport specific influences in terms of training and access to relevant material, financial, and human resources.

The non-theory and the thin theory eschew these distinctions. Whatever serves to realize external goals, or whatever serves the enhancement of performance, is by definition acceptable. The thick theory considers such distinctions to be of crucial importance because they facilitate an examination of those factors that promote a qualitative development according to moral ideals, and those that ought to be eliminated or compensated for. Let me be somewhat more specific.

Sport talent is determined by chance in the natural lottery. Chance is not unjust in itself. However, the consequences we draw from it might be. There is a general norm of relevance here, which is expressed in various ways in various ethical theories. Basically, it holds that we should not treat people differently in significant matters based on inequalities upon which they cannot influence in any significant way (1, p. 372; 19, p. 74). The intuitive idea is that these are inequalities for which we cannot really be claimed responsible.

To a certain extent, this general norm is followed in sport. We classify competitors according to biological development and age, according to sex, and in sports in which it is of significant impact on performance such as in boxing and wrestling, according to body mass. In addition, (and just as in the natural lottery) chance and luck play significant roles in the environmental influence on athletic performance in general and in access to technology in particular. Here, elimination and compensation of non-relevant inequalities become more difficult. The history of the amateur rules within Olympic sport is a story of how such efforts can become means of socio-economic and political repression (8). The simplest strategy is probably to try to strive for equal access to resources such as equipment and facilities out of competition, and for equal opportunity to perform through strict standardization of equipment within competitions. I will return to possible strategies in the discussion of technology below.

After having eliminated or compensated for inequalities for which the individual cannot be held responsible, we are left with relevant inequalities in athletic performance. My endurance, my strength, my speed, or my technical and tactical skills, are to a certain extent due to my genetic predispositions but even more to the environment in which I have been born, raised, and in which I currently live. If norms for equal opportunity are met, my own efforts in this respect are of crucial importance. Sport performances, then, become matters of our abilities to cultivate our talent through training, and our efforts in competitions. This interpretation of athletic performance enables the realization of talent prescribed by the Aristotelian principle.

The Thick Theory and Technology

The version of the thick theory suggested here says that an athletic performance is a combination of talent and its cultivation in terms of environmental influence in which our own efforts play the dominant role. In the sport setting, other factors of influence on performance ought to be eliminated or compensated for. What are the consequences of the thick theory of performance for views on sport technology?

In terms of sport equipment used by athletes to perform in competitions, the thick theory and the thin theory are in agreement. There is a need for strict standardization procedures. However, the justification of such procedures differs. Whereas the thin theory is built on the ideal of quantitative growth, the thick theory prescribes individual and team performances based primarily on the performers' talent and their own efforts in cultivating it.

When we proceed towards out-of-competition performance-enhancing technologies, the differences between the thick theory and the thin theory become clearer. In particular, the thick theory has a serious problem with expert-administrated technology that is not really controlled by, and does not require, personal efforts from athletes. Examples come primarily from the sport medical expert systems that support many athletes and teams today. Current examples include extreme diet regimes and highly specialized nutritional supplements, high altitude chambers, and of doping, and in the near future, probably genetic technology (15). In general, we can say that the athlete submits to these means without really being able to control or influence them. These processes can hardly be justified if our goal is individual, qualitative, growth. Moreover, they can hardly be justified in terms of contributing to the value of sport, either. Let me take the example of high altitude chambers in cross-country skiing used as performance-enhancing means to boost the quantity of red blood cells in the body.

This method of performance-enhancement requires athletes simply to spend considerable amounts of time in a technologically created low-oxygen atmosphere. If done properly, this can significantly enhance the level of hemoglobin in athletes' blood and hence their oxygen transportation and endurance capacity. When some skiers use this method, they get a competitive advantage, and there will be a coercive effect upon others. Let us imagine, then, that all athletes use the method with the same performance-enhancing result. Everyone skis, say, 5% faster. To the non-theorist, little is gained, as the ranking lists shall still be the same. From this perspective, only exclusive advantages are of interest. From the thin theory-perspective, something is gained. We are able to enhance human performance with 5%, which is intrinsically good. From the thick theory-perspective, the introduction of high altitude chambers as a means towards performance-enhancement is a problem. Little is gained in terms of adding value to the sport of cross-country skiing. The technique is the same, the excitement of the competition is the same, and the final ranking of skiers is identical. In fact, something is lost. As compared to a non-high altitude chamber situation, athletes have to spend more time in artificially created environments isolated from "the real world". Moreover, their performances become more dependent upon external support systems. This reduces the responsibility of the individual. Therefore, the use of high altitude chambers represents additional costs and little or no benefit.

The thick theory should not be understood as anti-technological in the sense of representing irrational *Angst* of technological innovation -- as the kind of technological pessimism expressed in the Frankenstein thesis: Technology develops according to its own, uncontrollable logic and is about to take over human life and societies (3, p. 10-12). The thick theory represents a critical and systematic understanding of sport technology and prescribes the choice of the technology that seems to promote human values and respect for the individual athlete, and it rejects technologies that do not. In the case of high altitude chambers, the theory does not necessarily imply a ban but prescribes exploration of other possibilities for performance-enhancement that include athlete effort.

A somewhat different problem arises when expert-administrated technologies become potentially harmful, such as in the case of most doping substances and methods. The thick theory is linked inherently to moral ideals. The Aristotelian principle plays a key role. However, for a practice to open for the exercise of individuals' realized capacities (their innate or trained abilities) and facilitate human flourishing. In addition, the thick theory often embraces another general moral norm that is respected in most ethical theories -- a norm for beneficence, or in its weaker version, for non-maleficence (19, p. 108 ff.). Human flourishing depends upon not exposing others or oneself to unnecessary harm. Indeed, in most sports we find rules against harmful conduct. We talk of "showing studs" in soccer, of high knee lifts in jump shots in handball, and we require helmets in amateur boxing. At the same time, the development of the technical and tactical skills of these sports implies at least some risk for injury. The key, then, is to distinguish between risks that competitors can control and that can be said to have a constitutive function in the practice, and non-necessary risks and potentials for harm. To the thick theorist, most doping substances and methods represent non-necessary risks. They do not only give performance-enhancement without athlete effort -- they expose athletes to serious risk for harm. Here, we enter the realm of the unacceptable. Technologies of this kind ought to be banned.

Concluding Comments

I have suggested a particular understanding of sport technology and suggested a way of examining systematically and critically its role and consequences in sport. I have argued that in order to evaluate various kinds of sport technologies from a moral point of view, we need a proper theory of sport, or more specifically, a proper theory of athletic performance from which such evaluations can take place. Moreover, I have discussed what I consider to be three representative ideal-typical theories of performance and their implications for sport technology.

As the terminology indicates, the non-theory is no theory of sport. It is, rather, a theory of the external goals towards which sport can be an efficient means, such as prestige and profit. The non-theory is a purification of the sport understanding of totalitarian regimes and of cynical commercial interests. The non-theory accepts any kind of sport technology as long as it serves the purpose of reaching the desired external goals.

The thin theory accepts all means of performance enhancement as long as there is equality of opportunity in terms of equal access to all competitors. The underlying premise in this theory is that sport is an arena for the testing out of human limits in objective terms. The view can be linked to various kinds of technological optimism that can probably be found in some high performance sport settings in which any technological innovation is considered a good innovation.

The third, thick theory perspective implies further regulations on the use of technology in sport. Technology that requires athlete efforts and skills, to which there is equal access, and that does not represent unnecessary risks for harm, is acceptable and in fact of fundamental constitutive function and value in sport. Expert-administrated technology that enhances performance without athlete effort, such as, for instance, so called high altitude chambers, is problematic and should be challenged. Expert-administrated technology that in addition represents unnecessary risks of harm such as doping is unacceptable and ought to be banned. I have put emphasis on the discussion of the thick theory for two reasons. First, as this is the theory that implies the most regulations of technology, it is also the most complex one and the one that needs the more elaboration. The other reason is, of course, that I find the thick theory the most promising one. In my view, some kind of thick theory represents the only possibility of a sound technological ethic in sport. This does by no means mean that the thick theory is without problems. Its very development builds on the drawing of distinctions that are sometimes controversial and upon which there is considerable disagreement. However, when examined in open and democratic ways, these disagreements are the very hallmarks of a living, dynamic ethical discourse without which sport may degenerate and vanish.

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