

Lesson 5 Beyond Boundaries

Faster, Higher, Stronger: What Innovations Bring

Five sprinters were getting ready at the starting line of the men's 100-meter sprint in 1896 when the first modern Olympic Games were held. One sprinter in particular caught the spectators' attention. He was touching the ground with his hips raised towards the sky, while the others were simply standing. The spectators laughed at the position of his body, but it took only 11.8 seconds for them to witness him setting the first Olympic record. This sprinter's name was Thomas Burke, and his innovative technique called a crouch start has become the standard starting position since then. Here are some key innovations introduced by great athletes who challenged themselves to find what worked best. They proved that there is always room for improvement.

The Flip Turn in Swimming

Up until the 1936 Olympics, swimmers used an open turn. They touched the wall with one or two hands first, turned to the side, and pushed off from the wall by bending their legs. However, open turns had the critical disadvantage of disrupting the swimmers' flow and speed.

This problem was resolved by an American high school student named Al Vande Weghe. While practicing the backstroke, he realized that his legs were too heavy for an open turn, which caused him to slow down. To overcome this drawback, he devised a technique that is now known as a flip turn. He would make a forward roll first to change direction and then kick against the wall to speed ahead. This technique allowed him to maintain as much of his speed and momentum as possible. His willingness to take a risk and keep experimenting paid off. Using this technique, he won a silver medal in the 1936 Olympics. Flip turns are now the standard in freestyle and backstroke races.

The V Style in Ski Jumping

Ski jumping is one of the most spectacular winter Olympic events. The skiers jump from the height of 90 meters, which is as high as a 30-story apartment building. Most of the skiers are able to stay in the air for about five to seven seconds. While they are in the air, they are influenced by "lift," an upward force produced by air on a fast-moving object. When the force of lift is balanced with the force of gravity, the skiers can fly for long distances. The key factors for them to increase lift and jumping distance are increasing their speed, spreading out their bodies and skis, and adjusting their body angle.

As jumps are judged mostly on jumping distance as well as their style, skiers have tried many techniques to maximize their time in the air, aiming to achieve longer distances. In the beginning, most skiers simply stood upright throughout their jump. Later, this upright style was replaced by the Kongsberger style. The skiers' upper body was bent at the hips, with their arms extended in front of them and their skis parallel to each other. This technique doubled the average jumping distance.

Everything changed in 1985, however, when Swedish jumper Jan Boklöv introduced the V style. In this style, the skiers position their skis into a "V" shape with their heads placed between the skis. This modification increases the surface area and creates more lift, leading to even greater jumping distances. Wind tunnel tests showed that the V style improves air lift by 28%, which means that skiers can stay in the air longer. This style also enables skiers to land at a safer speed, reducing the risk of injury.

The V style was not immediately adopted by the skiing community. In fact, it was initially ridiculed and received fewer style points for breaking the standard of parallel skis. However, the technique proved so successful that by 1992 all Olympic medalists were using it.

The Fosbury Flop in High Jumping

Dick Fosbury practiced the major high jump techniques, such as the scissors and the straddle, for the Olympics when he was in high school. He soon realized, however, that these techniques were challenging for him because he didn't have the strength or speed they require. Then he found that when he went over the bar backward and landed headfirst, he could jump higher than anyone on his team. As an engineering major, he later explained that arching the body backward keeps the jumper's center of gravity low to the ground. The lower the center of gravity, the less energy required to successfully jump over the bar. Another advantage is that with this technique, there is less chance that the jumper's arms or legs will hit the bar and knock it down.

The result was a huge success. Fosbury won a gold medal in the high jump in the 1968 Olympics. But up to that point, every jumper in the event had only gone over the bar forward, not backward. Local newspapers criticized his style, saying that he looked like "a fish flopping in a boat" and calling him "the world's laziest high jumper."

Eight years later, however, 90% of all high jumpers were going over the bar backward just like Fosbury. Today, every high jumper performs what is known as the "Fosbury Flop."

Athletes often face challenges when they realize that conventional techniques aren't working out for them. They then make determined efforts to overcome these weaknesses. Some of these athletes end up developing remarkable innovative techniques, which eventually become the new norm. Innovation flourishes when individuals have a deep understanding of themselves and discover their own unique strengths.