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Dan Farrugia, a Cornell student majoring in industrial and labor relations, aspires to a career in sports law. So as he finished his junior year, he appealed to his buddy Sam Querrey for a summer internship, figuring it would be more germane to his future profession than lifeguarding or scooping ice cream. Would Querrey, a rising player on the ATP Tour, want to hire an aide-de-camp to do everything from...
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| BY DAVID SABINO |
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THE SPORT PSYCHOLOGIST

Focused on the application and practice of sport psychology

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Flow has been described within sport psychology as an optimal state underlying peak performance. However, the consequences of experiencing flow may not always be beneficial. Our negative consequence might be that of contributing to dependence on the activity that interacts with, or is associated with, the flow experience. This study explored the dichotomous consequences of flow, using case studies of big wave surfers. Fifteen elite surfers completed in-depth, semi-structured interviews. It seems clear from the results that the surfer experienced positive consequences of flow. However, they also exhibited symptoms of dependence on surfing. It is suggested that there may be an association between the experience of surfer, and the way of coping in an activity. Some specific recommendations for further research into the relationship between flow and exercise dependence are made.

unambiguous, when one is focused on the task at hand and feels both a sense of control and a loss of self-consciousness, one is experiencing flow (Csikszentmihalyi, 1993, p. 4).

Furthermore, flow has been held to be a state of mind where one is poised between relaxation and anxiety. This balance depends upon the perceived matching of skills to challenges faced, both of which must be above a person’s average. Flow has been depicted as the ultimate autotelic experience—one that is performed purely for its own ends (Csikszentmihalyi, 1975).

Part of the pleasure of flow comes from its dissonant nature, via the transcendence of the self that takes place (Stranger, 1999). When “the voice within has been silenced” (Celsi, Rose, & Leigh, 1995, p. 17), the individual is free to act without the usual worries that plague our daily existence. Because there is no...
The Dark Side of Flow: A Qualitative Study of Dependence in Big Wave Surfing

Sarah Partington and Elizabeth Partington
Northumbria University
Steve Olivier
University of Abertay Dundee

Flow has been described within sport psychology as an optimal state underpinning peak performance. However, the consequences of experiencing flow may not always be beneficial. One negative consequence might be that of contributing to dependence on the activity that interacts with, or is associated with, the flow experience. This study explored the dichotomous consequences of flow, using case studies of big wave surfers to provide empirical evidence for the construct. The findings revealed that while flow can be an enjoyable and rewarding experience, it can also lead to negative outcomes, such as dependence and addiction. The results highlight the importance of understanding the potential risks associated with flow experiences in extreme sports.
that they cannot cope without their daily fix (Morgan, 1990; as cited in Backer et al., 2003; Robbins & Joseph, 1980). Clearly, in a sport such as big wave surfing, dependence can have potentially negative effects as a result of the inherently dangerous nature of the activity. There have, for example, been several fatalities while engaging in the sport in recent years (Olivier, 2006).

In an effort to resolve such contradictions, Sachs (1982) suggested a continuum in which exercise for the negatively dependent individual has progressed from an important aspect of the individual’s life to a controlling factor which dominates other choices. In contrast, the positively dependent individual retains control. Similarly, Pargman (1980) distinguished between runners who were addicted/dependent and those who were commited/dedicated, with the distinction being made primarily on the basis of whether the involvement in running was on a rational and pragmatic basis, or for the emotional or euphoric feelings associated with the activity.

Given this lack of consensus regarding dependence, it is not surprising that the potential addictive qualities of flow have not been considered in sport. However, we feel that flow should be studied from a broader perspective, one that allows potential negative consequences to be considered as well. After all, while Csikszentmihalyi (2002) acknowledged that flow may increase the richness of life, he also warned that we must look at the larger, potentially negative consequences of any individual instance of flow. Such an investigation has yet to be conducted in sport.

Csikszentmihalyi (2002) strongly suggested that we “need to learn to distinguish the useful and the harmful forms of flow, and then make the most of the former while placing limits on the latter” (p. 70). This is not to say that flow itself is either good or bad, rather that such a state may be associated with both positive and negative consequences. It is beyond the scope of this paper to isolate flow as the causal factor in exercise dependence. Indeed it would be inappropriate to attempt to make such a claim given the complexity of human motivation and the multitude of factors likely to underpin it, and we acknowledge that flow is dependent on the balance of perceived challenge and the athlete’s skills. A similar comment could be made about trying to claim flow as the one causal factor underpinning peak performance, but we are not attempting to establish a cause-effect relationship. The aim of this paper is to redescribe the balance in the study of flow and to take a broader perspective than has so far been taken in sport psychology, and we do so by exploring potential negative connotations.

To explore flow experiences and their potential negative consequences, it is necessary to find an activity in which flow frequently occurs. Risk is one factor that has been described as an effective catalyst for reaching transcendent states such as flow (Stranger, 1999). Csikszentmihalyi (1990) explained the link between flow and risk as the combination of high challenges and high skills. While there must be a skill challenge balance Csikszentmihalyi stated that both the skills and challenges must be above a person’s average.

Accounts of the nature of thrill in risk-taking leisure activities often emphasize the ecstatic feelings of oneness with the environment, the loss of self in the activity, and an intense awareness of the moment (Stranger, 1999). In fact states such as this have been found to be key motivating factors for participation in risk sports (Celsi, et al. 1993, Stranger, 1999).

Given the findings described above, it is plausible to suggest that participants in risk sports are likely to experience flow. “Big wave” surfing is an activity that carries the possibility of serious injury and even death. As such, it is a sport that includes challenge and risk and requires great skill. Big wave surfing was thus deemed a suitable context for exploring flow. The current study therefore focused upon a group of elite big wave surfers to examine both the positive and negative consequences of experiencing flow.

Methods

Participants

The sample was comprised of 15 of the world’s top big wave surfers (12 men and 3 women, mean age 37.0 years). Countries of origin of the surfers included Hawaii (note that Hawaii is referred to as a country in competitive surfing, as distant from the USA), Australia, and South Africa. The gender bias was dictated by the nature of the activity, in that there are fewer women than men who surf big waves. The population seems relatively old in comparison with other elite sport studies, but successful big wave surfing has historically demanded a long apprenticeship, hence the seemingly advanced age of participants. The mean age was also skewed by two older surfers who are no longer as active, but who are recognized to be pioneers of the sport.

Those who participate in such contests are acknowledged both by their peers and by the media as big wave surfers. Participation in these contests is by invitation only. Such invitations are issued on the basis of past achievement and/or peer recognition. Potential participants for a study of this nature were thus identified as being part of a selected pool of elite contest competitors.

All participants in the study were extremely high achievers in this elite category of surfing, and were selected for participation on this basis. For example, participants included past winners of the Eddie (probably the most prestigious big wave contest), Mavericks, the Red Bull contest, two winners of the Billabong XRL Big Wave Challenge, as well as two former World Champions.

Big wave surfers are a small elite subset of the larger surfing subculture. They are recognized as big wave surfers at least in part by their participation in specific surf contests. What constitutes a big wave contest is defined by the size of the surf. The size limit deemed to be acceptable for a contest to run is a subjective judgment made by an experienced contest director, but it is accepted in the surfing world that the handful of recognized big wave contests are held in conditions that others would consider extreme and dangerous. Given their experience and elite status, it was felt that these surfers would provide appropriate information-rich cases (Sparkes & Partington, 2003) for the study.

Procedure

The study was approved by the University’s Ethics Committee. Initial access to participants was via the third author’s long-standing relationship with a key figure in surfing administration, who acted as a gatekeeper to the culture (Humphreys & Atkins, 1995). A participant pool was discussed with the gatekeeper, and
individuals were selected according to the criteria identified above (i.e., invited participation in elite big wave events). Potential participants were contacted by the gatekeeper and asked if they would consent for their contact details to be passed on to the third author, to discuss the possibility of participating in a study on big wave surfing. Those who agreed were subsequently contacted by telephone by the third author, who orally explained the project to them. Three surfers of the original eighteen contacted were unable to participate due to other commitments.

Following this oral explanation, the third author met with each participant and informal consent forms were administered and completed. Participants were then offered the opportunity to ask further questions before the completion of one-to-one semi-structured interviews. Interviews lasted one to two hours and took place in Hawaii and South Africa at times that coincided with a high concentration of the world’s best performers being present at the same locations. The majority of the interviews took place in private locations such as the third author’s hotel room or the participant’s home or office, where conditions were conducive to informal conversation. Doors were necessary to ensure and reasons for participation. Basic, explanatory, focused, silent, suggestive, and mirror probes were prepared as interview facilitation tools.

According to Atkinson (1998) an interviewer must know how to invite stories as responses. Following the advice of Chase (1995) the aim was to encourage the participants to take responsibility for the meaning of their talk. Thus, rather than engaging them in abstract discussion, they were asked to talk about their own personal experiences. The first question (How did you get involved in surfing?) opened up the floor to the interviewee and the interview progressed from there.

Data Analysis and Results
Following transcription of the interviews, the first author read the transcripts several times, making notes and seeking to gain an understanding of the interviewee’s point of view (Maykut & Morehouse, 1994). Next a constant comparison method of data analysis (Glaser & Strauss, 1967) was employed. During this process, the data were analyzed for emerging categories and themes, which were then organized into successively broader and more abstract categories. The initial level of

When the initial list of raw themes was complete, an inductive analysis was performed to generate a set of higher order themes (Jackson, 1995). This process involved examining raw themes and comparing them with all other themes at a particular level, integrating themes with similar meaning while separating themes with different meaning. Finally themes were integrated into more general, abstract dimensions.
time in life. It was just another area of extremism. . . . If they are truthful with you, you will probably find that a large percentage grew up in unstable home environments. My only influence in big wave surfing was my dad, but my instability was my dad. My dad was a serious drinker and there was a lot of arguing and fighting within the home. . . . It was unstable for myself growing up in that environment. The same reason that I did drugs is the same reason that I do big wave riding, and that’s sad. . . . If you were a confident, emotionally stable person, you are confident as to why you are on this planet there is no reason to go over the speed limits that you work. (Participant N).

Discussion

Although we cannot claim a direct measure, it seems clear from their comments that many of these surfers experienced flow as defined by Csikszentmihalyi (1975). Surfers talked about times when they felt a match between skills and the challenge they had encountered, when there was a merging of self and awareness, and they exhibited high levels of concentration, felt in control of their performance, and noticed alternations in their perceptions of time. While the surfers enjoyed feelings of flow and reported both momentary and long-term benefits in relation to both mood and performance (Jackson, 1992; Privette, 1981; Williams & Krane, 1993), they also talked about feeling addicted to the spiritual sensations and experiences that they had while surfing.

Pryor (1983) distinguished dependence from commitment on the basis that dependent individuals are participating primarily to experience euphoric feelings, rather than participating for more rational purposes. This seemed to be evident in the comments of some of these surfers who identified the sensations as the primary motivator rather than for example financial incentives.

In the same way that habitual drug addicts may need to continually increase their dosages to gain the appropriate sensations, some of these surfers found that they needed to increase the speed and size of the wave that they were surfing to recapture the feelings that they had previously experienced. Such accounts are reminiscent of Hanssenblad and Downs’ (2002) notion of tolerance, a construct they view as central to a definition of dependence.

Morgan (1979) and Sachs (1982) speculated that an individual was only negatively dependent on an activity if he or she had lost control of his/her participation in that activity and allowed the activity to dominate all other choices. In the case of some of the surfers surfing was placed before other activities such as starting a family, gaining employment, and attending social events. Several surfers could be classified as exhibiting this ‘social impairment’ on Rieber et al.’s (2003) dependence scale, or ‘conflict’ if the terminology of Hanssenblad and Downs (2002) is used. Similarly, continuing to participate when injured would be classified as physical impairment on Rieber et al.’s (2003) dependence scale, and linking back to Sachs (1982), would also indicate a loss of control.

We acknowledge the possibility that the activity itself may be responsible for dependence, rather than flow per se. Nevertheless, while we are not claiming in this paper to have found a causal relationship between flow and dependence, we do suggest that for some of these surfers, elements of the flow experience such as the skill challenge balance may be associated with the desire to surf. Such suggestions are in accordance with the work of Lamos and Tiggeman (1997) who argued that high levels of physical activity can contribute positively to a sense of self-esteem, and fit with the general notion of the positive consequences of flow (Jackson, 1992; Privette, 1981).

Several surfers in this study spoke of the feeling of accomplishment and the rush that they experienced when their skills were found to match the significant challenge that they had taken on. The notion of continually striving to increase both the challenge and the skill and as result increase the associated feelings was a common theme in this study.

However, there was also a less positive view of the pursuit, which was expressed as the futility of constant striving, and the improbability that satisfaction would ever be attained. People will always want to go higher or faster to increase the challenge just a little more. The view held suggested that the relentless pursuit could be viewed as a sign of personality dysfunction. These comments are in direct contrast to the findings of Lamos and Tiggeman (1997), who examined the personality characteristics of high level exercisers and found no evidence of personality dysfunction. However, it could be argued that these differences were due to the fact that Lamos and Tiggeman (1997) did not include risk sport participants in their sample. It was also suggested that risk sport participants may be particularly vulnerable to flow negative behavior due to their dysfunctional personalities. Although this comment was not commonly expressed, it is not an unreasonable suggestion. Because Csikszentmihalyi (1975) has indicated that some people may be more susceptible to the experience of flow based on their ‘autistic’ personalities, it is possible that people may also be more susceptible to any negative consequences of experiencing flow based on their individual personality characteristics.

Conclusion

Heeding Csikszentmihalyi’s (2003) call for a more rounded view of flow, we investigated the flow experiences of big wave surfers, being open to the possibility of finding both positive and negative consequences of experiencing flow. We contend that it is likely that these surfers did in fact experience flow while surfing, and that flow was likely to be associated with improved mood states, performance, self-esteem and fulfillment. However, application of both Rieber et al.’s (2003) and Hanssenblad and Downs’ (2002) diagnostic criteria for exercise dependence indicated that some of the surfers exhibited characteristics of dependence on surfing. Surfers talked of being addicted to the euphoric feelings experienced, and were willing to continue to surf despite family commitments, injury or potential death, to replicate these sensations.

Because some of the surfers were controlled by their surfing experiences, rather than in control of them, they could be classified as having a negative dependence on surfing (Sachs, 1982). Several of the surfers themselves confessed to being unable to function ‘normally’ in society because of their involvement in surfing, and there was the suggestion that the personalities of big wave surfers make them particularly susceptible to dependence.
While this article does not claim to have found a causal relationship between flow and happiness, it is reasonable to suggest that there is an association. Indeed Csikszentmihalyi himself actually suggested that flow may have additive qualities. In particular, several of the surfers talked of the rush that they felt when their skills were found to match a particularly difficult challenge (one that is above average) in the desire to replicate this feeling. This experience of the skill challenge balance has been identified as a key dimension of flow (Csikszentmihalyi, 1975), and it is possible that this experience this aspect of flow, and possibly others, may be associated with a compulsion to continue with an activity. The findings of the current study concur with Csikszentmihalyi's (2002) more rounded view of flow, and its potential additive qualities, in suggesting that the experience of flow within big wave surfing should not be viewed as a wholly positive phenomenon. Having raised awareness of the need to consider the dichotomous consequences of flow, it is suggested that future research should focus upon the potential interaction between the different dimensions of flow and dependence in other sport and exercise settings. Within extreme sports, the potential role of flow or dimensions of flow as precipitators of a willingness to engage in increasingly risky activity needs to be explored more fully. Finally, susceptibility to dependence due to flow or dimensions of flow needs to be studied in more detail. There is a need for a focus on sports and leisure contexts, and personality variables that may predispose individuals to be more susceptible to the potential negative consequences of flow, such as dependence.

Author Note and Acknowledgment

We acknowledge the input of an anonymous reviewer on this issue.

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Teaching Badminton Based on Student Skill Levels

By Jianyu Wang and Jeff Moffit

Helping children and adolescents develop physically active lifestyles is the core of quality physical education programs. Physical education must teach students skills, knowledge and dispositions needed to live a physically active life. Additionally, the national standards indicate that a physically educated person demonstrates competence in motor skills and movement patterns needed to perform a variety of physical activities (NASPE, 2004). Therefore, physical education teachers must help students develop movement competence in activities and sports so they have the skills to enjoy participation in physical activity.

Badminton has been identified as a lifelong activity. It is an inexpensive sport and everyone—children, seniors, and individuals with disabilities—can reach a level of enjoyment in the game after mastering basic skills and tactics.

At different skill levels, teachers need to design movement tasks appropriate to students at different learning stages. In the following discussion, performance characteristics of badminton at four different levels are presented and then followed by instructional strategies and skills proposed for students at each skill level. Figure 1 gives a brief explanation of each level.

Figure 1: Summary of four levels of student badminton play

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
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<tbody>
<tr>
<td>Students have difficulty making consistent contact with the shuttle and serving into game play area.</td>
<td>Students are able to make contact and play the shuttle into game play area however they usually use immature forms of the stroke.</td>
<td>Students have the fundamental knowledge and skills of the game, and the ability to make appropriate decisions and select different offensive tactics depending on the situation. Students are now developing the advanced strokes (drive stroke, overhead clear, etc.).</td>
<td>Students are able to use the clear and drive shots during games and begin to score by using basic offensive tactics. They are also able to position themselves in a defensive manner.</td>
</tr>
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Individuals can choose to play the game at different levels of intensity, from just maintaining a shuttle rally, to playing a singles or doubles match. Research indicates that badminton not only helps participants develop cardiovascular fitness (Docherty, 1982; Wright, 2007), but also improves bone health (Nordstrom, Pettersson, & Lorenzson, 1998). For these reasons, many schools have included badminton in their physical education curriculum.

In teaching badminton, teachers need to understand how students develop game play ability from a low level to an advanced level. Physical education researchers have urged teachers to pay more attention to changes in students’ movement performance (e.g., Chen, Rovagno, Todorovich, & Baber, 2003). Effort has been made to understand performance characteristics of badminton game play across students’ skill levels (Wang, 2004). Wang’s study found that the majority of high school students played games at a low level and during games they used immature forms of strokes, which are different from the strokes such as clear, drop, drive and smash described in badminton books (e.g., Grice, 1996). Wang’s findings have revealed the process of skill development in badminton that students most likely go through and the immature strokes beginners frequently use during the game. This knowledge can help teachers both predict what should be taught next in the skill development sequence of badminton, and understand what skills and tactics need to be assessed at different learning stages.

To help students develop competency in badminton, teachers must be able to develop movement tasks that match students’ skill levels. After identifying performance characteristics of the students'
at different skill levels, teachers need to design movement tasks appropriate to students at different learning stages. In the following discussion, performance characteristics of badminton at four different levels are presented and then followed by instructional strategies and skills proposed for students at each skill level. Figure 1 gives a brief explanation of each level.

**Level One**

Students at Level One frequently have difficulty making contact with the shuttle during practice and games. Most badminton beginners cannot place the shuttle into legal service and game play areas. Although some students at this level are able to make contact, they typically use immature forms of the strokes. One of the immature strokes is called the undifferentiated shot which is executed with an awkward form in a poor body position (Wang, 2004).

**Figure 1: Summary of four levels of student badminton play**

**Level 1** - Students have difficulty making consistent contact with shuttle and serving into game play area.

**Level 2** - Students are able to make contact and play the shuttle into game play area, however they usually use immature forms of the stroke.

**Level 3** - Students have the fundamental knowledge and skills of the game, and the ability to make appropriate decisions and select different offensive tactics depending on the situation. Students are now developing the advanced strokes (drive stroke, overhand
Articles Two to Eight Pages Long

As long as possible.

Drill 4: Students hit the shuttle to their partners and loop a rally. Students can maintain the rally without losing control.

The Drill: Students play modified doubles games by using any strokes as long as they can play the shuttle without a paddle or game zone.

Level Two

At Level Two, students are able to make contact and place the shuttle into the legal game play areas. However, they extensively use immature forms of the shot, such as the cooperative shot and unfiltered shot.

Additionally, many students at this level use another immature stroke called the developmental shot. This shot is performed with an observable intent to perform any of the strokes of clear, drop, drive, and smash, but the execution of the shot exhibits some problems in controlling the trajectory, placement, or power of the shot. Again, use of the developmental shot in gameplay might be an indispensable transition for badminton beginners.

At this learning stage, teachers need to help students refine immature forms of the strokes. Although students at Level Two may be able to continue to use developmental shots in practice and games, they should no longer use the cooperative shot and unfiltered shot. Students at this level are ready to develop the clear stroke because the movement structure of the clear is similar to the structure of the cooperative and developmental shot. It would be easy for students to learn the clear after they are able to perform a cooperative shot or developmental shot.

For students at Level Two, the instructional emphasis should be on teaching the clear shot. A clear refers to a shot hit with a high trajectory and the shuttle lands in the back court. There are two main clear techniques: (1) forehand overhead clear, (2) backhand overhead clear, (3) backhand overhead clear, and (4) backhand underhand clear. While teaching the clear, teachers should emphasize hitting the shuttle high and deep to the back areas of the court by using any backhand and forehand strokes. Teachers may teach students the clear in an order of forehand overhead clear, backhand overhead clear, backhand overhead clear and finally backhand underhand clear. During this stage, students need to develop their awareness of offensive and defensive tactics. Teachers may start to teach students a basic offensive tactic, such as placing the shuttle away from opponents and forcing them to move during the game. It is crucial for teachers to integrate the offensive and defensive tactics into the drills. For example, while assigning students to practice the clear with a partner, teachers may challenge students to hit the shuttle to the left or right corner of the court and force the partners to move back and forth. Meanwhile, students should be required to return to the center of the court after hitting the shuttle to their partners. This drill will help students understand that placing the shuttle away from the opponent may lead to scoring in the game. The following rules could be used to develop the clear:

Drill 1: Students practice the forehand overhead clear with a partner by hitting the shuttle to the areas close to the baseline and maintaining a rally as long as possible.

Drill 2: Working with a partner, students practice the forehand overhead clear and attempt to increase the accuracy of the placement of the clear. Students first stand in their usual position. The partner returns the shuttle. The partner returns the shuttle. The partner returns the shuttle. The partner returns the shuttle. The partner returns the shuttle. The partner returns the shuttle. The partner returns the shuttle.

Level Three

The primary characteristics of students at performance Level Three is that they increasingly use forehand clear although they still use the developmental shot in games. At this learning stage, students are ready to learn the serve. Students need to know that another offensive tactic they can use in the game is to use points by using forehand smashes. Teachers must teach students that offensive tactics influence game strategies, and students maintain a rally as long as possible.

Drill 4: This is a serve relay. The format of the drill is similar to the clear relay. Students use the serve to move points and regularly return to the base court during games.

Level Four

Students at Level Four are advanced beginners. They are able to dominate the court and drive during games. They have learned the basic knowledge of offensive and defensive techniques. Students are able to score by using basic offensive tactics, which are to place the shuttle away from opponents and use the forehand clear. Teachers demonstrate awareness of defending their space by regularly returning to the base court. However, they are not ready for the setup defense. Students are able to use the drop and smash in the games. One possible reason is that these students may not feel confident enough to execute advanced strokes in game situations. Students often wait for their opponents to make mistakes to win points rather than trying to score by using aggressive play.
The Use of Heart Rate Monitors in Physical Education

By Randall Nichols, Kathryn L. Davis, Tim McCord, Dave Schmidt, and Alex M. Slezak

The ever-rising rate of obesity and the need for increased physical activity for young children is well documented. Data suggests that today’s youth are not participating in enough quality health-enhancing physical activity either in or outside of school (Centers for Disease Control and Prevention [CDC], 2005). Heart rate monitors have been used by adult exercisers for many years to monitor and assess the intensity of exercise sessions. However, heart rate monitors have become increasingly more common within physical education programs to: (1) supplement the physical education fitness curriculum; (2) motivate students to achieve higher intensity levels; and (3) assess student progress in reaching higher intensity levels.

It is important for practicing education teachers to be aware of several different methods for using heart rate monitors to motivate and assess exercise intensity during physical education classes. A secondary physical education teacher noted the following about using heart rate monitors:

The day after getting my first heart rate monitor, I put it on some of the students in the class. I asked the other students if they would be interested if I would measure their heart rate. I found that the students were all very interested in using the monitor to monitor their heart rate. The day after I put the monitor on them, I asked them to tell me how they felt after using the monitor. They all said that they felt better after using the monitor. I think that this is a great way to motivate students to exercise more and to assess their exercise intensity.

This quote shows that heart rate monitors are an effective method for motivating students to be more physically active during physical education classes.

Why Use Heart Rate Monitors?

Cardiovascular disease is the number one cause of death in America. Research has shown that 90% of children who live a sedentary lifestyle during their teenage years also fail to exercise adequately when they become adults (Curtin, 2001). Because of this statistic, it is important for students to be aware of the importance of heart rate monitors. Heart rate monitors have been used for many years to monitor and assess the intensity of exercise sessions. However, heart rate monitors have become increasingly more common within physical education programs to: (1) supplement the physical education fitness curriculum; (2) motivate students to achieve higher intensity levels; and (3) assess student progress in reaching higher intensity levels.

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It is important for practicing education teachers to be aware of several different methods for using heart rate monitors to motivate and assess exercise intensity during physical education classes. A secondary physical education teacher noted the following about using heart rate monitors:

The day after getting my first heart rate monitor, I put it on some of the students in the class. I asked the other students if they would be interested if I would measure their heart rate. I found that the students were all very interested in using the monitor to monitor their heart rate. The day after I put the monitor on them, I asked them to tell me how they felt after using the monitor. They all said that they felt better after using the monitor. I think that this is a great way to motivate students to exercise more and to assess their exercise intensity.

This quote shows that heart rate monitors are an effective method for motivating students to be more physically active during physical education classes.

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The Use of Heart Rate Monitors in Physical Education

By Randall Nichols, Kathryn L. Davis, Tim McCord, Dave Schmidt, and Alex M. Slezak

The ever-increasing rate of obesity and the need for increased physical activity for young children is well documented. Data suggest that today’s youth are not participating in enough quality health-enhancing physical activity either in or outside of school (Centers for Disease Control and Prevention [CDC], 2005). Heart rate monitors have been used by adult exercisers for many years to monitor and assess the intensity of exercise sessions. However, heart rate monitors have become increasingly more common within physical education programs. To: (1) supplement the physical education fitness education classes only, to teaching students to be physically active outside of the physical education classroom. Heart rate monitors help specifically to assess whether students in physical education classes have exercised in the appropriate heart rate zones in order to achieve a training effect for cardiovascular endurance, one of the components of health-related fitness. Depending on the grade level of the students taught, there may be specific advantages or disadvantages involved in using heart rate monitors.

The advantages of heart rate monitors will greatly outweigh any disadvantages as teachers and students become more familiar with their use. Among many advantages, heart rate monitors allow a student to choose an aerobic activity (e.g., run, walk, basketball, racquetball, etc.) and, as long as there is a predetermined amount of time in the target heart rate zone, the activity session can be considered a success. Another advantage is that students develop in the accuracy of palpating their own heart rates. Giving students more responsibility for their own learning increases their motivation to exercise. In addition, teachers are able to measure the effect of students more easily with heart rate monitors in order to hold students accountable for their own learning. This accountability is also valuable for program assessment and documenting program quality.

The main disadvantage of heart rate monitors is in physical education is the cost. The cost issue can be overcome by purchasing just a few monitors, and to use those monitors to help demonstrate their worth to administrators and parents. Physical education teachers, in an effort to advocate for the programs, should invite the school’s principal to do observations during one of those lessons. If a physical education teacher can demonstrate that a budget request will be spent on something that truly helps students, the chance of getting the requested equipment increases dramatically.

In addition, grant writing is a strategy that can be employed to help offset the lack of budget. Grant opportunities for obtaining physical education equipment and resources are at all-time high (e.g., Physical Education in Progress, NAPAP, Halls of Honor, National Physical Education and Sports Education Department grants), and the assistance necessary for writing these types of grants is more readily available than ever. Another disadvantage to heart rate monitor use is that at first, there may be difficulties with the logistics of putting...
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STRATEGIES
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July/August 2009
VOL 22 • NO 6

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When in Doubt, Ask Your Teacher
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Good research requires a sound foundation of **scholarly** resources.
You can’t build a scholarly foundation on non-scholarly sources.
What is the MOST important characteristic in determining Scholarly or Non-Scholarly? Journal of Magazine?
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A Bibliography
Periodicals exist on a Continuum Scholarly / Non-Scholarly

• Some have characteristics of both Journals and Magazines
• Also, it’s possible for a periodical to contain both Scholarly and Non-Scholarly articles.
Can’t Always Tell From Title

• Ladies Home Journal – Not a Journal
• Quest – A Journal
It’s even more difficult Online
Sam's Club

Backed by the sport’s loudest cheering section, Sam Querrey was the hottest player on the hardcourt circuit.

Dan Farrugia, a Cornell student majoring in industrial and labor relations, aspires to a career in sports law. So as he finished his junior year, he appealed to his buddy Sam Querrey for a summer internship, figuring it would be more germane to his future profession than lifeguarding or scooping ice cream. Would Querrey, a rising player on the ATP Tour, want to hire an aide-de-camp to do everything from arranging his travel to running his blog? "Sam said 'Sure' and offered me a salary of three percent of his prize money," says Farrugia, 20. "I would have done it for free, just for the chance to see sports from the inside."

Apart from being one of the coolest summer jobs on record, Farrugia's gig has been pretty lucrative. Querrey is emerging as the answer to the eternal tennis query, Who will be the next U.S. star? Through Sunday the 6'6" Californian had gone 16-5 in matches since Wimbledon, winning a title in Los Angeles and reaching the finals in Newport, R.I., and Indianapolis. After upsetting Andy Roddick last week to reach the fourth round in Cincinnati (where he lost to Lleyton Hewitt), Querrey, 21, attained a career-high ranking of 26 and was in a position to win the summer U.S. Open Series with a good showing at this week's tournament in New Haven, Conn. Plus, since Wimbledon, he has won nearly $235,250. (Intern's take: $7,057.50.) Coincidence? "It's been great to have someone do the dirty work—getting rackets strung, making reservations—but it's really been great just having someone to hang out with," Querrey says. "It's definitely working out for both of us."

Querrey's summer breakthrough wasn't altogether unexpected, armed as he is with a serve that regularly surpasses 125 mph and a weapons-caliber forehand. But he's also improved his fitness and conditioning, and as a result he plays more patiently and uses his power more judiciously. "He's not playing himself out of points quite as much," says Roddick. "He's got a better sense of when to pull the trigger."

As Querrey has climbed the charts, he's also spawned the sport's loudest cheering section. One of Farrugia's duties at tournaments is to organize the Samurai, a band of fans dressed in Karate Kid outfits who cheer and chant and bang gongs during Querrey's matches, straddling the line between spirited and obnoxious. At the Indy event, five members painted their chests to read GO SAM but at one point rearranged themselves to spell MO GAS.

The Samurai will be heard from at the U.S. Open, where Querrey will be seeded for the first time. As for Farrugia, he plans to extend his internship through the fall and finish college in the spring. He'll accompany Querrey to Bangkok, Beijing and several European cities on the fall circuit. Says Querrey, "I'm playing too well to cut him loose now."

Now on SI.com Daily team coverage of the 2009 U.S. Open begins Aug. 30 at SI.com/bonus

PHOTO (COLOR): HAMMER TIME: Querrey's rapid deliveries have been a key to his success since Wimbledon.
Online articles lack most of the clues found in print.
What is the most important Online characteristic?
What is the most important Online characteristic?

The presence or absence of a Bibliography.