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**ritical Thinking in
Physical Education**

Jeffrey John Walkuski

INTRODUCTION

Critical thinking has become an important issue within Singapore recently and, in particular, within the context of the Singapore educational system. The Singapore government has made it clear that critical thinking skills in students should be fostered and developed by the schools. Opportunities in a variety of disciplines exist for the teaching of critical thinking that may not only benefit students, but the nation as well.

But what is this concept called “critical thinking”? How can it relate to the area of physical education and sport? How can critical thinking be used in the gymnasium, playing field, or within the physical education lesson?

This article will attempt to answer these questions and will provide suggestions on how teachers can assist students to apply critical thinking as they perform skills within the psycho-motor domain.

DEFINITIONS OF CRITICAL THINKING

Critical thinking has been defined by Ennis (1962, 1987) as “reasonable and reflective thinking that is focused on deciding what to believe to do” (Ennis 1987, p.10). Beyer (1987) views critical thinking as an evaluative skill which allows an individual to assess information in order to make a judgement on its validity, worth, or accuracy. Both Ennis and Beyer assert that critical thinking also involves a systematic process of approaching, evaluating, and thinking through a problem or challenge.

In 1991, McBride proposed an initial model of critical thinking in physical education. In this model, he proposed that critical thinking in physical education can be visualized as a loosely configured four-step

process: cognitive organizing, cognitive action, cognitive outcomes, and psycho-motor outcomes. Cognitive organizing is the process an individual goes through while focusing on a movement problem and assessing and analysing information regarding that problem. Cognitive action is the process of utilizing the information gathered in the organizing stage in order to develop and refine responses to a movement problem. Cognitive outcomes and psycho-motor outcomes can be viewed as inter-dependent processes where the learner can evaluate a solution to a movement problem by discussing it with a teacher or coach and then, ultimately, assess it through actual motor performance. Therefore, in McBride's model, critical thinking is viewed as an active process of organizing information, using that information to develop a strategy to solve a problem and applying it in a movement situation.

In the years following 1991, McBride's model continued to drive the dialogue regarding critical thinking in physical education and sport. The topic continued to gain interest as critical thinking began to gain more emphasis particularly within the North American educational system. In 1995, Tishman and Perkins, following the lead of McBride, defined critical thinking in physical education in a broader sense. They regarded critical thinking as a process that encompasses all levels of ability and the everyday experiences of the student. They view critical thinking inclusive of the concept of **creative** thinking where an individual goes through the process of thinking of various possibilities as solutions to a problem. It is a very basic way of thinking not unlike the everyday types of decision making and problem solving we go through on a day-to-day process, and most importantly, critical thinking does not require high levels of intelligence, just simply the ability to look at various solutions, to take different views, and to explore more options to a problem.

Within the context of physical education and sport, Tishman and Perkins (1995) adapted their broad definition of critical thinking into four areas. They call the first area *broad and adventurous thinking*. This type of critical thinking involves the decision on the part of the teacher/coach to look beyond the obvious, moving from the status quo and applying a different point of view when solving a problem. For example, a basketball coach might have a problem with a promising player at the guard position (such as not being able to dribble using his left hand). The coach could take a more "traditional" approach to solving the problem by drilling the player with practice using only the left hand when dribbling or the coach could take an "innovative" approach by

assigning the player to play on the left side of the offensive court, thereby forcing him to use a left-hand dribble more often.

The second area of critical thinking, proposed by Tishman and Perkins (1995) possesses two sub-areas and is called *causal and evaluative reasoning*. This type of critical thinking, **causal reasoning** refers to the ability of humans to make connections between past and present phenomena. It should be noted that this ability does not, however, automatically “cross over” from one domain (cognitive) to another (psycho-motor) as an athlete’s conscientious adherence to a training regiment may not transfer to his need to be conscientious with his studies. In **evaluative reasoning**, an individual makes some judgement about an outcome of an idea or explanation. For instance, a member of an athletic sprint relay may judge a proposal for a strategy to win an upcoming race. She then thinks through the positive and negative aspects of the strategy before agreeing to it.

Their third area of critical thinking is called *planning and strategic thinking*. These types of critical thinking can be a common place in the psycho-motor domain where an individual may plan out an exercise regiment or might devise a strategy to deal with a problem with their tennis forehand. Planning and strategic thinking can involve the use of mental imagery, coming up with different plans both mentally and physically or concentrating on the product and/or process of a movement.

The final area of critical thinking, is *metacognition*. Metacognition, in the generic sense according to Tishman and Perkins, means thinking about thinking. It is the ability of an individual to “get outside” of his mind and allow the mind to contemplate and assess the flow of its own thinking. Athletes and students who become self-reflective and self-evaluative about their physical performances are utilizing metacognition. The use of such thinking at the right moment can enhance physical performance as it allows individuals to make the connection between their thinking and their actions, attitude and performances.

In summary, the Tishman-and-Perkins critical thinking embraced and elaborated on previous models in several areas:

1. thinking which involves risk taking and unique solutions to problems;

2. thinking which makes connections between past experiences and allows the individual to evaluate those connections;
3. thinking which involves planning behaviors and strategy and
4. the act of thinking about thinking.

PRACTICAL APPLICATIONS OF CRITICAL THINKING IN PHYSICAL EDUCATION AND SPORT

Critical thinking may be adapted to the physical domain in two ways (Tishman & Perkins 1995). The first of these involves taking advantage of opportunities that are already present in the teaching area and the second involves making use of the various strategies available to us through critical thinking.

While there are many opportunities for students and athletes to apply the four broad areas of critical thinking to the psycho-motor domain, the challenge is learning to recognize when these opportunities become available. The teacher/coach must be able to recognize those situations in which students can apply critical thinking, assist those students/athletes through the critical thinking process(es), and then must follow up on this process by asking the students questions that prompt critical thought. (See Table 1 which illustrates examples of these situations and possible questions to be used by the teacher/coach.)

In 1993, Schwager and Labate argued that some physical education teachers indirectly foster critical thinking in their students by having them focus on the formulation of decisions that may lead to successful skill performance. Often, particularly in the area of movement in the lower primary grades, teachers have many opportunities to allow their students to utilize critical thinking through the formulation of movement problems and challenges. Primary teachers can also foster critical thinking within sport and fitness units. (See Table 2 which provides some ideas for primary teachers to use to foster critical thinking in their students in the areas of educational games, educational gymnastics, and educational dance.)

Secondary teachers and coaches can also challenge their students/athletes to think critically by providing opportunities for creative and independent problem solving. Opportunities exist in the sporting arena, such as allowing learners to think out a strategic plan or having them

create a unique movement solution. Such strategies can be included in sport, fitness, and extra-curricular activities. (See Table 3 which provides some ideas for secondary teachers to use to foster critical thinking in their students in the areas of sport, games, fitness and wellness.)

CONCLUSION

Critical thinking does have a place in the psycho-motor domain. Physical education and sport environments can provide a supportive environment for individuals to learn how to think critically. The practical nature of physical activity allows the individual to apply a new strategy, attempt a new movement and evaluate the worth of the response almost immediately. Students can be challenged to produce unique solutions to movement problems, create new versions of a game, and think through issues related to fitness and health. However, both teachers/coaches and students must be able to recognize the available opportunities to apply and utilize critical thinking. But, as previously stated, the challenge is learning to recognize when these opportunities become available.

Finally, regardless of the strategies taught or the activities involved, the teacher must serve as the facilitator of the critical thinking process. The teacher fosters the ability of the students to concentrate their attention towards decisions that are necessary for skilled performance. Through this active role, the teacher will be able to assist the students in utilizing critical thinking for the achievement of success in the areas of fitness and movement.

Table 1: The Use of the Four Critical Thinking Areas (adapted from Tishman & Perkins 1995)

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| Broad and Adventurous Thinking | |
| <p>Opportunities <u>when it is important to:</u> look at other points of view think creatively about options, plans, or ideas challenge assumptions</p> | <p>Questioning How can this be looked at differently? What are some different points of view? What are your assumptions? What is the obvious solution/idea here? How can you move beyond it?</p> |
| Causal and Evaluative Reasoning | |
| <p>Opportunities <u>when it is important to:</u> understand the factors leading up to an event or claim consider the consequences judge the worth or truth of something</p> | <p>Questioning 1. causal reasoning Why is this the way it is? What are the causes? What are the consequences? Who and what is effected? 2. evaluative reasoning Why should you believe this? What are the reasons for and against? Which reasons count the most? The least? What proves this? What is the evidence?</p> |
| Planning and Strategic Thinking | |
| <p>Opportunities <u>when it is important to:</u> identify a goal proceed step by step have a strategy or plan</p> | <p>Questioning What are your goals? What plan or strategy will help you achieve your goals? If you didn't make a plan, what could happen? Are there obstacles? How will you deal with them?</p> |
| Metacognition | |
| <p>Opportunities <u>when it is important to:</u> be aware of one's thinking guard against pitfalls in thinking set standards for thinking evaluate the effectiveness of thinking</p> | <p>Questioning What is your thinking like? Can you describe it in words, pictures or gestures? What is good about your thinking? What could be improved? What standards would you like to apply to your thinking? What can you learn from the thinking you used in similar situations in the past?</p> |

Table 2: Strategies to Foster Critical Thinking in Primary Students (adapted from Cleland & Pearse 1995)

| Educational Games |
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| <p>Manipulation and throwing: allow students to experiment with different ways of throwing. Ask students to describe the way that produced the most force, accuracy, which way determined direction, height, etc. (this technique can be used for a variety of motor skills and sport skills)</p> |
| <p>Spatial awareness: Have students explore different group formations while in groups of three or four. Students can try to pass an object like a bean bag or ball amongst themselves using different formations like a straight line with one player behind the other, a triangle, a square, etc. Have the students compare and contrast the effectiveness of the different formation on their ability to pass and receive the object.</p> |
| <p>Student designed games: Students are allowed to create their own game. Deciding on equipment, playing area, number of players, basic rules etc. Students can also modify teacher designed games and are asked to defend their modifications within the context of the game.</p> |
| <p>Comparison of person-to-person vs zone defense: Organize students into small-sided games where they can explore the effectiveness of different defensive schemes on a teams ability to move/pass a ball, score a goal, effectively utilize space.</p> |
| Educational Gymnastics |
| <p>Picture cards: Provide students with cards which show different shapes, balances, pathways. Have them create a movement which incorporates these movement concepts. Expand on their responses by having them use different levels, body parts to create the movement.</p> |
| <p>Contrasts in shapes and balances: First demonstrate or have students take the lead executing different shapes with a partner. Have students develop contrasting/ conforming shapes or balance from their partner (symmetrical or asymmetrical).</p> |
| <p>Have students design movement sequences: Using different types of equipment, space, etc. challenge students to create responses to your challenges. For example, have students create a sequence of a balance, a locomotor movement and a balance. Have students use different speeds when executing the sequence.</p> |
| <p>Challenge students' movement possibilities through imagery: Challenge students thinking by having them imagine that they are walking across sticky ground, slippery ground, etc. Discuss the differences between the two surfaces and their effects on locomotion. Have students move as a particular animal, a small animal, a large animal. Why are there differences in their movements?</p> |

| Educational Dance |
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| <p>Moving to music: Pre-record different types of music on a cassette tape. Each type of music can represent different tempos, emotions, or musical dynamic. Students listen to the music and create movements that represent the tempos, dynamics of the music. Students can work alone, in pairs or in groups. Use locomotor and nonlocomotor movements.</p> |
| <p>Movement maps: Using materials which have different textures (crumpled aluminum foil, rocks, cotton balls, paper, etc.), students create a "map" on a piece of A4 paper. The materials are affixed to the paper and students connect the materials by drawing different pathways between them. Using the map and space, students use different locomotor movements to travel along the different pathways and perform a nonlocomotor movement that is representative of the texture of the material.</p> |
| <p>Space....the final frontier: Discuss the physical properties of space with the students (e.g., no gravity, orbits, meteors, etc.). Have students create movements to selected music that mimic the behavior of those objects in space. Have them use differing concepts such as big/small, fast/slow, circular/oval, etc. in initiating the movements.</p> |
| <p>Use props: Students can think of how different types of props such as skipping ropes, wands, balls can be used in developing movement sequences for groups. Have students use a movement framework (i.e., body, space, effort and relationship aspects) to create movement ideas.</p> |

Table 3: Strategies to Foster Critical Thinking in Secondary Students

| Sports and Games |
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| Expand on the games for understanding model: Utilize the games for understanding model to teach strategic aspects of games. Allow students to think through and solve certain tactical aspects of a game. Have students think about similarities as well as dissimilarities across games, etc. |
| Comparison of person-to-person vs. zone defense: Organize students into small-sided games where they can explore the effectiveness of different defensive schemes on a teams ability to move/pass a ball, score a goal, effectively utilize space. |
| Student modified games: Students modify versions of proper games. Students are challenged to create situations that force players in a game to utilize a particular skill. They devise ways to maximize participation and are asked to defend their modifications within the context of the game. |
| Improve skill performance: If students are having difficulty performing a proper dig pass in volleyball, the teacher might ask questions related to the position of the body, the position of the arms, the action of the body, etc. (i.e., "What part of the arms contact the ball?", "Where should your shoulders face when contacting the Ball?", "Why?") |
| Fitness and Wellness |
| Student writing: Using the concept of cardiovascular fitness as an example; for a wet weather programme students are asked to write continuously for three minutes on the topic "Why is cardiovascular fitness important?" Students are paired up to share their opinions and the class is brought together and a succinct list is created. Other fitness concepts can be explored/discussed in the same way. |
| Health: For another wet weather programme, students are placed into groups and discuss various topics regarding health such as diet, exercise and smoking. Students create unique ways to "get the message" to their peers and present these ideas to their classmates. |
| Student designed fitness programmes: As part of a fitness or wellness unit, students are assigned to create a fitness programme for their own personal use. Areas included in the programme would include; cardiovascular fitness, muscular strength and endurance, flexibility, body composition. Students take part in their designed programme and measure outcomes over a period of time. Depending on the outcomes, students can reflect on their programmes effectiveness and can think through possible modifications. |

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