

PE Division, Department of Creative Arts and Physical Education,  
The Hong Kong Institute of Education

## **Summer School for PE Teachers 2008**

Critical Thinking and Creativity through Physical Education

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# **The following collection of information aims at providing some references for presenters:**

## **Key Questions to ask:**

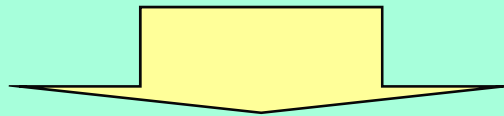
- 1 Why should critical thinking and creativity be included in the PE curriculum?
- 2 What are critical thinking and creativity?
- 3 How can they be fostered through PE?

# 1 Why should Critical Thinking and Creativity be included in the PE curriculum?

## 1.1 Current practices of PE in schools:

- PE- dominated by the “education of the physical” orientation- more capable of developing students’ physical growth and development
- Movements as well as physical activities dominate most PE lessons.
- The mistaken belief of dualistic body and mind conception → PE does not have much contribution to students’ intellectual development

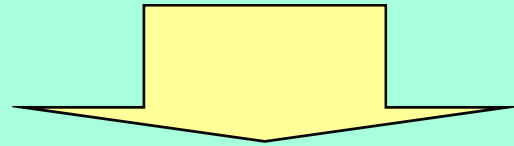
- PE instruction -teacher directed, didactic and drill-based instruction--less capable of developing students' thinking and innovation for improvement of motor performance.
- Relatively little opportunities are provided for students to be questioned, analyze motor problems in the context of PE.



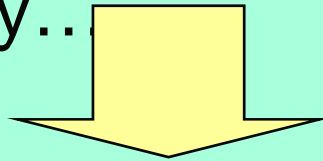
- Relatively little attention for critical thinking and creativity in PE.
- Nurturing students' creativity and critical thinking- relatively unfamiliar for most PE teachers.

## 1.2 Possible important points of Critical Thinking and Creativity in PE

- “Educating students through physical activities”- the direction of PE for schools in Hong Kong as specified in the curriculum guides since the Seventies (CDC 1975, 1980, 1985, 1988, 1995, 2002, 2007).

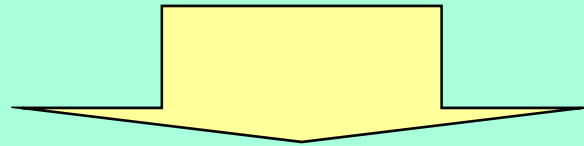


Cultivating students' all round development ... develop intellectual ability..

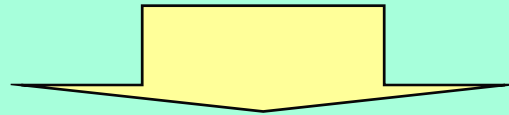


Critical thinking and creativity -important intellectual skills and should be the major aim of PE

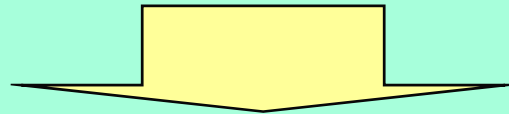
- Local educational reform-new goals of education  
“all round development” &  
**“learning to learn”**



Generic skills



Creativity & Critical Thinking



for life-long learning capability.

(Education Commission, 1999; 2002).

- To encounter the dualistic body-mind misconception  
→ promoting creativity and critical thinking should be incorporated as important areas in the school PE curriculum
- Marlett and Gordon (2004) - sports and games in PE provide rich opportunities to develop thinking and reasoning skills as children are naturally inventive, which is a high level of thinking, and creative meaning.
- Students - unique in a variety of ways - preferred learning style, gender differences, intellectual skill level of functioning, cultural diversity, variation in self esteem, knowledge, motivation, intellectual inclination and maturity  
→ helping students to acquire the tools of mind – effective tackling the issue of diversity. Elder (2004)

- students -skilled and insightful evaluators through thinking critically and creatively of issues- able to take charge of their learning.
- thinking, feeling and moving - coequal partners of PE
- Critical thinking and creativity skills →important as means of solving problems facing our complex world
- students have to be developed to become good thinker→intellectual empowerment.



## 2 What are critical thinking and creativity?

### 2.1 Critical Thinking

#### 2.1.1 As **THINKING** for Decision and judgement

- Reasonable, reflective, skilful and responsible **thinking** for
  - facilitating good judgment
  - deciding what to believe and do
  - making reasonable and defensible decisions about movement

(Ennis 1962, p.10; Lipman, 1988; McBride, 1992).

## 2.1.2 As **Types of thinking**

- “critical thinking is drawing out meaning from a given data or statements” for accurate evaluating judgement. “It is the questioning and enquiry we engage into judge what to believe and what to do” (CDC 2002, p.24)
- as essentially evaluative in nature and as analyzing objectively any claims, source, or belief to judge its accuracy, validity, or worth (Beryer 1987).

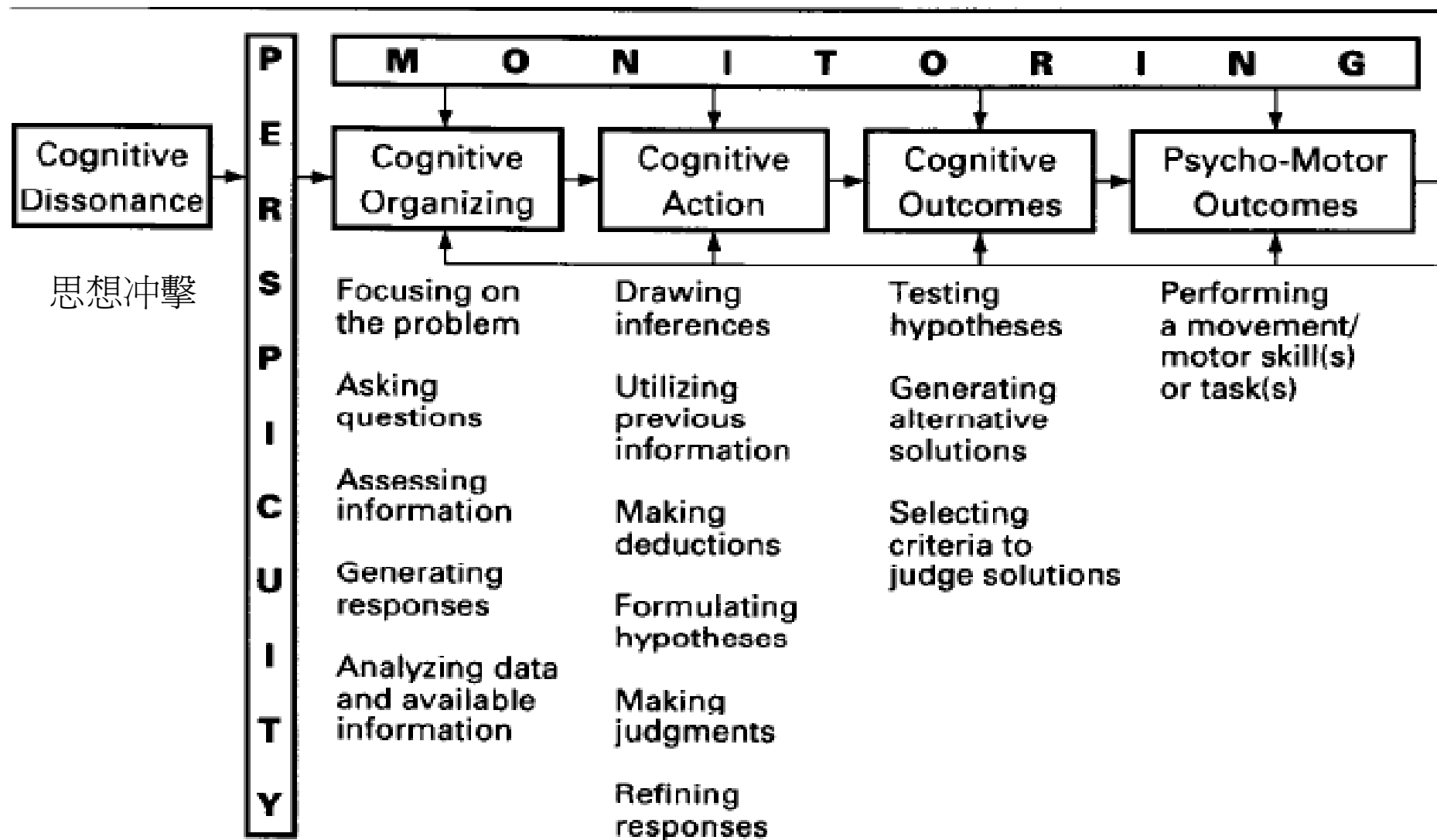
### 2.1.3 As ability, skills and process of higher order thinking

- Reflective - the ability to draw upon information from one's general and domain-specific knowledge areas (McBride, 1992).
- Reasonable - a logical thought process
- 'Critical thinking as the operating skill with which intelligence acts as experience' (DeBono 1983,p.703).
- As a process-use Higher Order Thinking / Cognitive skills/decision making/creative thinking/ problem solving/ reasoning

## 2.2 Theoretical frameworks of Critical Thinking

### a 4 Phases of critical thinking

- 1 Cognitive organization-Recognizing the nature of the problem or the challenge-problem- listening to teachers' verbal explanation, observing teachers' demonstration, reading a task card, questioning...provoking students' thinking
  - 2 Cognitive action-Using information generated in the previous stage to refine responses, make judgments and formulate hypothesis
  - 3 Cognitive and psychomotor outcomes-testing the hypotheses or responses, making judgment movement responses, test , provide alternative or different movement responses
- Suitable for Motor skills acquisition, problem solving, initiative games, creative activities (McBride 1992)



**Figure 1. Critical Thinking Schema (McBride, 1992)**

## b Levels of Thinking Complexity

- Level I- name, count, describe, match, recite, recall, select, tell
- Level II - analyze, compare, contrast, classify, distinguish, explain, infer, reason, sequence, solve
- Level III- apply a principle, estimate, forecast, hypothesize, judge, predict, make analogy, speculate, evaluate

(adapted from Fogarty and Bellance 1989)

## c Bloom's Taxonomy of cognitive objectives-

- Knowledge
  - comprehension
  - application
  - analysis
  - synthesis
  - Evaluation
- 
- **(Bloom's taxonomy In Anderson and Sosniak1994)**

## d Thinking Categories

- clarifying ideas,
- assessing the accuracy of information
- inference-related abilities, and
- problem solving abilities.(Ennis 1987, p.33).

-Knowledge in critical thinking process and the mastery of execution of critical thinking skills (Beryer 1987).



## 2.3 Creativity

- As thinking process / mental processes involving the generation of new / original / innovative ideas or concepts, or new associations between existing ideas or concepts.
- As Behaviour - CDC, (2002) suggests that “creative behaviour (of an individual) is the result of a complex of cognitive skills/ abilities, personality factors, motivation, strategies, and meta-cognitive skills” (p.22).
- As **Both**- They involve thinking or behaving imaginatively, critically and purposefully.
- As ability to produce original idea and solve problems CDC, 2002)

# Creativity

Creativity is an important but elusive concept. It has been defined in a variety of ways. Some people define it as an ability to produce original ideas and solve problems, others see it as a process, and yet others take it as certain personal qualities. Creativity is a complex and multifaceted construct. Within the individual, creative behaviour is the result of a complex of cognitive skills/abilities, personality factors, motivation, strategies, and metacognitive skills. A person's creative performance may not correspond to his/her developmental stage.

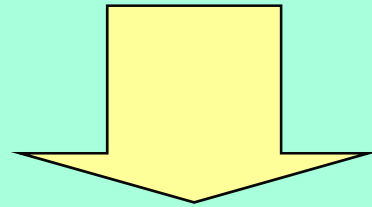
Although the demanding process of teaching for creativity is hard to make routine, some principles apply in general. To develop students' creativity, we ask them to go beyond the given information, allow them time to think, strengthen their creative abilities, reward their creative efforts, value their creative attributes, teach them creative thinking techniques and the Creative Problem Solving model, and create a climate conducive to creativity<sup>6</sup>. These principles can be employed in all KLAs.

## Theoretical constructs of creativity

- Creativity-as-product and as-process concept (Brockmeyer, 1987)

### 3-phase theoretical framework

- Preparation phase/element-sensing
- Incubation phase/element-improvising movements
- Verification phase/element-composing



Creativity- movement **processes-varying, improvising and composing-movement** category system

- Provides direction for content and instructional methodology for PE –

## b Means for promoting Creativity

- invent,
- experiment,
- explore,
- originate,
- follow instinct
- examine
- discovery,
- self expression and
- problem solving

## Critical thinking & Creativity-holistic and complementary constructs

- Critical thinking do not exclude --creativity
- Creativity concerns original ideas and innovations while critical thinking tackles students' evaluative judgment.
- (Ennis 1987)– formulating hypotheses, alternative ways of viewing a problem, questions, suggesting possible solutions, plans for investigating- creative acts under Critical Thinking

### 3 How respective skills of “creativity” and “critical thinking” can be developed through PE?

#### 3.1 Teachers – changing conceptions → emphasizing Critical Thinking and Creativity in PE

- Be creative teachers and creative teaching
- Willing and capable of planning, organizing and evaluating relevant learning experiences for their students
- Serving as facilitator rather than controller of information
- Limit intervention to students' learning
- Have expectation on students' critical thinking and creativity
- Assume responsibility of thinking for students

(Mcbride, 1991; Schwager & Labate, 1993; McBride and Cleland 1998; Park and Heisler, 2001; Zachopoulou et al, 2006).

## 3.2 Pedagogical changes

### Lesson focus

- Provision of time and opportunity for thinking and inquire
- Shift traditional demonstration-replication, direct mode of instruction to indirect mode of teaching
- Use teaching styles that promote inquiry
- Structure optimal environment for nurturing creativity and critical thinking,
- Structure learning goals, experiences, activities

### Strategies include

- Ask questions
- Have students compare and contrast
- Design situation for inference
- Encourage students to make movement responses
- Involve students to debriefing sessions on consolidating movement solutions
- evaluating solutions based criteria and
- analyzing the quality of movement (Cleland and Pearse, 1995 ;Cleland 1994)

# Possible Teaching Cognitive skills

- estimating,
- evaluating,
- classifying,
- analyzing,
- assuming,
- grasping principles,
- noting relationships among other relationships,
- offering opinions with reasons,
- making judgment based on criteria,
- generating original ideas and
- innovating.



### 3.3 Cultivated in the context (“dispositions”-pre-requisites) that Students are

- Structuring Student centered learning environment & instructional mode
- shift more responsibility of learning to students with strategies of peer tutoring, cooperative learning and higher-order questioning
- allowed to explore and make mistakes
- open-ended learning situation
- open minded
- sensitive to others' opinions and contexts
- able to look at the whole picture
- able to generate and accept alternative solutions
- being motivated and willing to engage

(Lipman, 1988 ;McBride, 2004; Gossett and Fisher,2005;(McBride, 2004; Park and Helsler 2001;McBride and Cleland 1998)

## Descriptors and exemplars of critical thinking in PE

Key Stage	Descriptors of Expected Achievements across the School Curriculum	Exemplars of Implementation in Physical Education
Key Stage One (P1 - P3)	<p>Learners will learn to:</p> <ul style="list-style-type: none"> <li>• extract, classify and organise information from a source.</li> <li>• identify and express main ideas, problems or central issues.</li> <li>• understand straightforward cause-and-effect relationships.</li> <li>• distinguish between obvious fact and opinion.</li> <li>• recognise obvious stereotypes, assumptions, inconsistencies and contradictions.</li> <li>• formulate questions, make predictions / estimations and hypotheses.</li> <li>• draw simple but logical conclusions not contradictory to given evidence and data.</li> </ul>	<p>Learners:</p> <ul style="list-style-type: none"> <li>• identify the effects of smoking and alcohol consumption on performance in physical activity and health.</li> <li>• understand the causal relationship between risky actions and sports injuries.</li> </ul> <p>(CDC,2002,p.24-25)</p>

## Key Stage Two (P4 - P6)

Learners will learn to:

- understand and make deductions/inferences from sources.
- cross reference other sources to determine the reliability of a source.
- understand the concepts of relevance and irrelevance.
- distinguish fact and opinion as well as source and evidence.
- question obvious bias, propaganda, omissions, and the obvious fallacies.
- formulate appropriate questions, make reasonable predictions and hypotheses.
- draw logical conclusions based on adequate data and evidence, and make predictions about consequences.

Learners:

- judge the reliability of sports news.
- understand the relationship between sports gears and performance.
- question the propaganda and appeal of commercial fitness plans for obese people and distinguish their practicability.

### Key Stage Three (S1 - S3)

Learners will learn to:

- compare different sources, note contrasts and similarities, and determine their reliability.
- distinguish fact, opinion and reasoned judgment.
- be aware that value orientations and ideologies would affect the perspective of a source.
- recognise and challenge stereotypes, inconsistencies, emotional factors, and propaganda.
- draw and test conclusions as well as hypotheses, identify reasonable alternatives and predict probable consequences.

Learners:

- make judgments on the issue of drug abuse related to sports.
- examine the benefits of sports participation to individuals, and predict the associated outcomes.
- study different fitness plans, understand personal needs and make appropriate choices.

#### Key Stage Four (S4 and above)

Learners will learn to:

- distinguish real and stated issues, false and accurate images, and relevant and irrelevant evidence.
- recognise and challenge subtle consistencies and inconsistencies, unstated fundamental assumptions, permeating value orientations and ideologies.
- distinguish among sophisticated fact, opinion and reasoned judgment.
- be aware that the selection and deployment of information/ facts is affected by personal perspective.
- draw warranted conclusions, predict and assess probable consequences and make reasoned judgment in reading, writing, and speech.

Learners:

- analyse different opinions given by different people on sports matters, distinguish the myths and facts, and make personal judgment.
- distinguish the inconsistency between referee's decision and replay, challenge the rationale of the rules and suggest solutions.
- analyse the values and feasibility of organising major international sports events in Hong Kong, and present their views through debates and project works.

## Descriptors and exemplars for creativity in PE (CDC,2002,p.23)

Descriptors of Expected Achievements across the School Curriculum	Exemplars of Implementation in Physical Education
<p>Learners will learn to:</p> <ul style="list-style-type: none"><li>strengthen their creative abilities and display: fluency<sup>7</sup>, flexibility<sup>8</sup>, originality<sup>9</sup>, elaboration<sup>10</sup>, sensitivity to problems<sup>11</sup>, problem defining<sup>12</sup>, visualisation<sup>13</sup> imagination, analogical thinking<sup>14</sup>, analysis, synthesis, evaluation, transformation<sup>15</sup>, intuition, logical thinking, etc.</li><li>develop creative attitudes and attributes: imagination, curiosity, self-confidence, independent judgement, persistence and commitment, tolerance for ambiguity, openness to new and unusual ideas/ approaches, deferment of judgement, adaptability, willingness to take sensible risks, etc.</li><li>use and apply the Creative Problem Solving Model and creative thinking techniques: brainstorming, 6W thinking technique, 6 hats method, attribute listing<sup>16</sup>, idea checklists, synectics<sup>17</sup> mind mapping, etc.</li></ul>	<p>Learners:</p> <ul style="list-style-type: none"><li>express themselves through dance movements.</li><li>create movement sequences in educational gymnastics.</li><li>transfer throwing skills to the actions of spiking and smashing.</li><li>practise “mental rehearsal” on shooting in basketball to improve their performance.</li><li>enhance aesthetic sensitivity through watching gymnastics and dance performance.</li><li>compose slogans for the cheering teams and design the programme for the sports days.</li><li>use “mental map” to design sports competition plans.</li></ul>

## Suggested teaching models favourable for fostering creativity and critical thinking

- Spectrum of Teaching styles- **Style C** 互惠式 **Style D** 自測式 **Style E** 包含式 **Style F** 導引式 **Style G** 聚斂式 **Style H** 擴散式 **Style I** 設計式 **Style J** 創造式 **Style K** 自學式 (Mosstun and Ashworth, 1990)
- Teaching games for understanding
- Sports Education Model
- The use of a variety of thinking skills
- Bloom's Taxonomy of cognitive objectives- knowledge, comprehension, application, analysis, synthesis, evaluation
- Problem based learning
- Project based learning
- Assessment for learning/learning outcome framework
- Cooperative learning etc.

(Garside, 1996; Lipman, 1988 ;McBride, 2004; Gossett and Fisher, 2005;(McBride, 2004; Park and Helsler 2001;McBride and Cleland 1998)

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