

學校體育的反思：未來與前瞻

雷雄德博士

香港浸會大學體育及運動學系

許士芬博士體康研究中心



香港浸會大學
HONG KONG BAPTIST UNIVERSITY

內容

- ▶ 文獻回顧：什麼是體育？
- ▶ 體育教學的發展
- ▶ 體育教師的教學能力
- ▶ 體育、教育與科學可以合一嗎？
- ▶ 學校體育的現況、局限與未來：
 - ▶ 競技運動 vs 全民健身(MVPA60)
 - ▶ 體育教學 vs 運動訓練
 - ▶ 體能評分利多於弊？
- ▶ 未來的發展方向：
 - ▶ 與世界接軌
 - ▶ 教育商品化
 - ▶ 體能活動(Physical Activity) 與醫療開支
 - ▶ 個人 vs 社會

什麼是「體育」？

國立臺北師範學院學報，第十六卷第一期（九十二年三月）321～340 321
國立臺北師範學院

體育的本質：一個認識論基礎

胡天玫*

摘 要

鑑於國內體育專業有關「體育是用大肌肉活動為方式的教育」之早期專業共識已無法澄清體育專業人士所面對的時代課題，本研究針對「你所謂的『體育』是什麼意思」的研究問題，從認識論角度企圖提供「為什麼上體育課」一個正當性基礎。

研究結果發現除了「大肌肉活動」及「教育」作為體育的家族相似性成員，「技術」亦是處於資訊時代的體育專業人員必須認同的體育家族相似性成員之一。

關鍵詞：體育、認識論、技術、個人知識、家族相似性

一、研究背景與研究必要性

何謂體育？為什麼要上體育課？通常一談到體育，很容易便聯想到躲避球與籃球兩個國內體育課最熱門的項目，學生也往往將體育與躲避球或籃球劃上等號，甚至體育老師亦以各種活動名稱（如新式健身操），來回答「學生學到什麼」的問題。如此一來，體育和運動便成為一對難以分辨的雙胞胎！體育課在學校課程裡的正當性受到質疑！¹

以各種不同的運動名稱來回答「體育是什麼」的問題，是從體育的外顯現象來了解體育，無助於正確地掌握體育之所以成為體育的內在原則。相對地，研究體育的本質（essence），即在追究體育的根本性質（nature），換言之，體育的本質是體育必然且重要的規定特徵，如果沒有這個特徵，體育就不會成為現在我們看到的樣子，而是別的面貌。

因此，體育的本質是我們用以進一步認識各種體育現象的抽象理念（idea）（Angeles, 1999），唯有正確地認識體育的本質，我們才能對「何謂體育」及「為什麼要上體育課」兩個重要議題提出合理的論點與主張。

一、「體育」：一個約定俗成的專業用語

「體育」(physical education) 乙詞係外來翻譯用語，1930 年《奏定學堂章程：學務綱要》是我國最早採用「體育」一詞的官方文件(楊文軒、陳琦，1996，頁 37)，甚至可追溯到 1904 年初(光緒 29 年年尾)。雖然體育一詞的輸入已有將近百年的歷史，但二〇年代《教育與人生》主編蔣湘清在〈體育究竟是什麼〉一文裡，就當時國人對體育的誤解與輕忽所提出之批判，即使用來描述今日台灣人對體育的觀念亦相當中肯：

體育二字，我國向無確切之定義。拳教師，說學習拳術就是體育；運動家，說踢球賽跑就是體育；兵八大爺，說兵式操就是體育；和尚道士，說修行靜坐就是體育。體育的解釋如此，社會上對於體育的觀念怎樣，也可想而知了(引自許光庶，1993，頁 90)。

二、「人類—遊戲者」：從「透過身體的教育」到「學習身體的運動」

回顧我國體育發展的歷史，從體操輸入期（1897-1904）、日本體操盛行暨美國體育輸入期（1905-1915）、雙軌制體育盛行期（1916-1921）、體育更新期（1921-1925）、盛倡運動期（1926-1932），³到運動道德培養取向（1960-1970）、運動知能傳授取向（1970-）、運動樂趣獲得取向（1980-）、健康體適能養成取向（1990-）與運動技能學習取向（1911-）。⁴唯百年來我國體育大部份是服務於強種保國、傳統文化、國防、外交與健康等體育外在價值（許義雄，1999），雖然自1986年解嚴後的台灣社會已展現出蓬勃生命力，但體育界的共識之釐清與建立仍有待努力。

基於「體育是用大肌肉活動為方式的教育」與「體育是教育的一環，目的化的身體活動」是兩個台灣最流行的體育定義，研究者主張建立體育界的共識，從這兩個定義著手應是一個與傳統對話的良好途徑。


長久以來，「體育是教育的一環」可說是台灣體育界的最高法則，不論是「用大肌肉活動為方式的教育」或「目的化的身體活動」，兩個台灣最流行的體育定義都是以「體育是教育的一環」為立論基礎，這也間接地造成了我國體育過份強調體育的「服務面」，忽略了體育的「本質面」。

我們可從美國三〇年代有關「透過身體的教育」(education through the physical) 與「身體的教育」(education of the physical) 之論爭中，進一步澄清「體育是教育的一環」之時代背景，並從中尋求更佳的詮釋方式。

「透過身體的教育」的代表人物是體育原理學者威廉斯 (Jesse Feiring Williams)，「身體的教育」則由曾三度來華的美國運動生理學者麥克洛伊(Charles H. McCloy) 為主要代言人。⁵當時美國教育界正處於進步教育運動 (progressive education movement) 風起雲湧之際，而美國體育界亦面臨著從體操課程邁向體育課程的轉換期，如同威廉斯所力陳一般：

我們若不面對兩個問題，沒有人可以真誠地檢視體育的含意。這兩個問題是：體育是一個身體的教育？還是體育是一個透過身體的教育？

(Williams, 1966, p.1)



體育的本質：一個認識論基礎



體育作為教育的一環，長久以來體育一直處於教育界的次等公民，此種副學習的地位也間接促成體育專業團體所強調的不是體育本身不可替代的特色，取而代之的是努力向傳統智識類的主學習靠攏！

教育局體育科的定位 (2020)

- ▶ 體育是「透過身體活動進行教育」。
- ▶ 它幫助學生提升不同身體活動所需的技能，瞭解有關活動及安全的知識，以發展活躍及健康的生活模式。
- ▶ 體育強調建立正面的價值觀和積極的態度，提升自信及發展協作、溝通、創造、批判性思考和審美等共通能力，是終身學習及全方位學習的重要基礎。

教育局體育科發展方向 (2020)

課程發展是持續不斷改進的過程，在體育學習領域，我們將：

- ▶ 建基現有優勢，並配合教育發展，推動課程變革。
- ▶ 除體育技能外，還強調培養學生的共通能力、正面的價值觀和態度等，**促進終身學習及全方位學習**。
- ▶ 鼓勵學校靈活運用課時、空間、資源及設施，以拓展校本課程。

(<https://www.edb.gov.hk/tc/curriculum-development/kla/physical-education/index.html>)

六大範疇的學習重點

六大學習範疇分別是：體育技能、健康及體適能、運動相關的價值觀和態度、安全知識及實踐、活動知識以及審美能力。各範疇的學習重點如下：

- 1. 體育技能** — 掌握各類體育活動所需的移動、協調身體和操控用具技能，以增加樂趣和提升表現
- 2. 健康及體適能** — 認識「體能活動促進健康」的原理，學習制定、實踐和評估個人鍛鍊計畫
- 3. 運動相關的價值觀和態度** — 了解運動競賽的意義，培養正面的價值觀和態度
- 4. 安全知識及實踐** — 學習「風險管理」，落實預防運動受傷的措施
- 5. 活動知識** — 汲取相關知識，以增加樂趣、提升表現和發展組織體育活動的能力
- 6. 審美能力** — 洞悉美的具體含意，加強評賞體育活動的能力



「體育」新聞 vs 「運動」新聞？

- ▶ 大眾傳播媒體對「體育」及「運動」名稱的迷失



「體育」新聞？「運動」新聞？國內大眾傳播媒體對「體育」及「運動」名稱使用情形分析

廖清海¹ 連振杰² 吳彥璋³

高苑科技大學¹ 南台科技大學² 蘭陽技術學院³

根據教育部編體育大辭典對體育及運動的定義：「體育（physical education）就是教育，是教育的一環，以大肌肉活動為方式。其設計以場地設備為情境，以有機體的身心成熟為依據，使個體在身體力行中，鍛鍊完美體格，發展理性行為，充實心智活動，進而擴大經驗範圍，提高適應能力，改變氣質，以繁榮生活，發揚生命意義。」「運動（sport）是任何種類的遊玩、消遣、運動、遊戲或競爭，不論在室內或室外，一般的通例是以個人的或團體的比賽為主要的部份，這種比賽的操作包含著某種技巧和身體的超越技能（體育大辭典編訂委員會，1992）。」

體育的本質

- ▶ 根據 Daryl(1994)及 Rowe(2001)對體育及運動的定義則為：
「體育是指有關提升身體的適能、動作技能的發展、社會的發展和智能的課程，尤其是針對幼稚園到小學 12 歲的孩童為對象。」
- ▶ 「運動是指有制度化的身體活動、比賽，其比賽結果取決於身體活動的技能、高超的本領和策略。」
- ▶ Lumpkin (2002)認為廣義的運動是一種身體的活動，在正式或非正式規則下與對手或自己競爭比賽，而從事運動的目的在於樂趣、休閒或獎賞。對體育的定義則為一種透過身體活動的過程，目的在獲得個人良好的身體、心理、社會和適能的技巧。

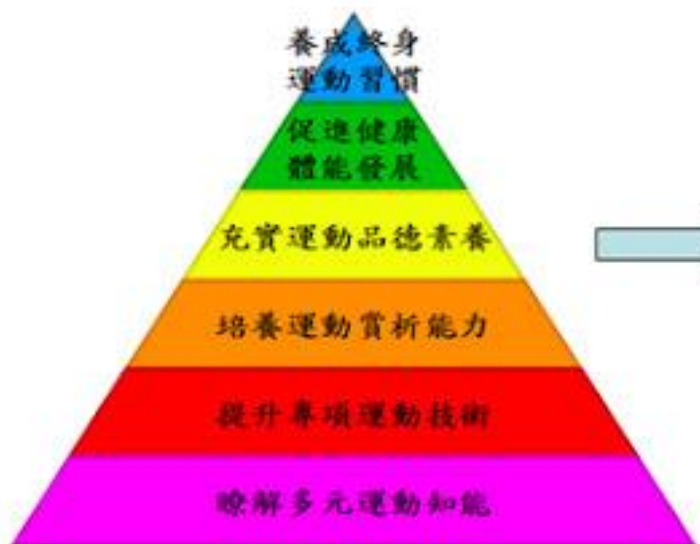
體育教學的發展

- ▶ 體育教學的內涵是什麼？
- ▶ 體育教學的本質何在？
- ▶ 體育教師的角色扮演決定了教學的內涵與教學的本質。
- ▶ 而教師是教學的主力但須**勇於求變**；學生是教學的主體必須**變中求同**；**品質**是尊嚴的起點更須**穩住不變**，這是體育教學的最高指導原則。
- ▶ 在體育活動中輔以老師的**創新設計**，啟發了孩子的**學習興趣與動機**，對體育課程產生了高度的**認同感**，不僅達到了情意的教學的目標，相信深深的影響了孩子**心理、身體的、社會的與智育的正向發展**。

(體育教學新思維，謝宛君 2015)

體育教學的發展

教學目標與核心能力



教學目標



能瞭解運動健康的益處，並培養專項運動興趣，進而從事規律性運動
應具備基本身體適應能力，並瞭解體適能要素及其強化方法
能發揮運動員精神，遵守各項運動禮儀，落實於運動情境中
能熟知各項運動項目技巧、規則及文化，以達成欣賞各項運動賽事之能力
能藉由專項運動的學習與鍛鍊，發揮個人之運動能力
能認識各項運動特性及其基本知識，以豐富多元運動知能

核心能力

What professional educators can learn from practicing physical education teachers?

Wong, Arthur;Lobo Louie

Physical Educator; Spring 2002; 59, 2; ProQuest Central
pg. 90

90

The Physical Educator

What Professional Educators Can Learn from Practicing Physical Education Teachers?

by Arthur Wong and Lobo Louie

Abstract

Physical education teacher education (PETE) is meant to produce competent physical education teachers in primary and secondary schools. On the one hand, PETE is shaped by our concept of physical education and sport; on the other hand, by the reality of the actual situation in the field. There have been complaints that PETE programs are not doing the job. The researchers attempted to identify what physical education teachers were doing in secondary schools and what help they needed from professional bodies in the field. In order to collect preliminary data for the purpose

educated person” is someone who has learned skills necessary to perform a variety of physical activities; does participate regularly in physical activity; is physically fit; knows the implications of and the benefits from involvement in physical activities, and values physical activity and its contributions to a healthful lifestyle (NASPE, 1992).

To develop such a person, physical education professionals need a rich repertoire of knowledge and skills. A typical professional PETE program typically includes the following areas (Douglas & Wiegand, 1987):

PE Teachers' Daily Duties

TABLE 1

TIME ALLOCATION PERCENT OF JOB-RELATED ACTIVITIES

	Experience	Mean	SD	N
• Teaching PE	BT	53.4%	18.2	43
	ET	50.4%	17.0	161
• School Teams Coaching & Competition	BT	26.4%	16.2	43
	ET	26.3%	12.5	161
• Sport & Extra Curricular Activities	BT	16.1%	10.1	40
	ET	17.4%	12.0	154
• Other PE-related Work	BT	11.6%	7.8	30
	ET	15.4%	13.7	113

BT = Beginning Teachers (= < 5 years experience)

ET = Experienced Teachers (= > 6 years experience)

**REPERTOIRE OF SPORT SKILLS PERCEIVED AS ESSENTIAL BY
PHYSICAL EDUCATION TEACHERS AS NECESSARY COMPETENCY**

Level of Importance	Events Males	Events Females
1	Track & Field	Basketball
2	Basketball	Volleyball
3	Volleyball	Track & Field
4	Soccer	Badminton
5	Swimming	Dance
6	Badminton	Gymnastics
7	Gymnastics	Swimming
8	Table-tennis	Team Handball
9	Team Handball	Table-tennis
10	Dance	Soccer

**SPORT SKILLS COMPENTENCY STATUS AS PERCEIVED BY
PHYSICAL EDUCATION TEACHERS**

	Competent	Not competent	Competent	Not Competent
	Male		Female	
Badminton	4	1	2	1
Basketball	34	7	21	2
Cricket	0	1	0	0
Dance	1	72	7	16
Fencing	0	1	0	0
Golf	0	2	0	0
Gymnastics	9	16	6	11
Handball	6	2	0	4
Hockey	0	1	0	2
Rugby	0	2	0	2
Soccer	9	6	1	7
Softball	0	3	0	2
Squash	0	1	0	5
Swimming	12	4	8	7
Table-tennis	2	2	2	5
Tennis	1	3	0	1
Track & Field	32	0	11	2
Trampoline	0	1	0	1
Volleyball	21	2	17	3
Wushu (Martial arts)	0	2	0	0
Sample size	133	130	75	72

Note: Modes for each column were in bold

EXISTING JOB-RELATED PROBLEMS AS PERCEIVED BY PHYSICAL EDUCATION TEACHERS

Areas of Problem:	Perceived Ranking:	Sub-content:
School environment-related	1	<ul style="list-style-type: none"> • Insufficient facilities/equipment • Insufficient curriculum time • A marginal subject and not part of the school assessment
Student-related	2	<ul style="list-style-type: none"> • Poor physical ability • Poor attitude and poor motivation • Poor discipline
Teacher-related	3	<ul style="list-style-type: none"> • Too heavy a workload • Incompetent in both skills & knowledge • Teacher burn-out
Social environment-related	4	<ul style="list-style-type: none"> • Subjects not valued by students/parents • Subjects not valued by the society as a whole
Subject matters-related	5	<ul style="list-style-type: none"> • No text books • No standard comprehensive curriculum • No standard/objective evaluation

體育教學如何做跨領域學習？

- ▶ 「運動與學童全人發展」的研究提供了最新的趨勢和做法，啟發教學對「身體素養（或稱運動素養physical literacy）」觀念的思考，以及落實身體活動跨領域整合的做法。
- ▶ 運動不應只是想到比賽獎牌或減重，而是要考量全人的發展，在家庭或課堂中都可以從引導孩子認識自己的身體和肢體動作開始。
- ▶ 身體素養強調的是對**自我身體的覺醒**，除了身體靈活或肌肉控制，還包含學習動機、認知能力、情緒管理等**心智和社會人際各個面向的生活能力**。

科學證據：運動健腦、健身、安定情緒

- ▶ 運動讓大腦運作更活絡
- ▶ 運動提高數學和閱讀表現
- ▶ 適度運動有益專注和情緒安定
- ▶ 運動幫助孩子改善自我控制能力
- ▶ 多樣性的活動有益認知發展

競技運動 vs 全民健身

第24卷第4期
2008年12月

沧州师范专科学校学报
Journal of Cangzhou Teachers' College

No.4Vol.24
Dec.2008

北京奥运会给我国“全民健身”运动带来的促进和反思

贺建国¹；蔡强²

(1.沧州师专 体育系, 河北 沧州 061000; 2.沧县回民中学, 河北 沧县 061028)

摘要:北京奥运会的成功举办和胜利辉煌的闭幕,使国人似乎在一夜间对体育有了崭新的认识,显得格外的精神和振奋。60年前的病夫之国,现在却成了世界第一体育强国,让世人有些不可思议,可这是事实,这是中国人用了较短的时间给世界的一个奇迹,这是值得我们高兴和快乐的一件大事,更是中国人让世人另眼看待的开始……。不过我们应清醒的知道,这些成绩只是体育的一种外在形式,是带有职业性极强的竞技运动,它与大众体育的“全民健身”运动有着本质的区别。因此,在奥运会之后应冷静的思考我国“全民健身”的现状与世界强国的差距和目前我国“全民健身”的情况。

关键词:北京奥运会; 全民健身; 体育; 反思

中图分类号: D619

文献标识码: A

文章编号: 1008-4762(2008)04-0006-01

競技運動 vs 全民健身

S全民運動**DAY**
SPORT FOR ALL

8月2日
2020年

日日運動 30分鐘 健康快樂 人輕鬆
Stay Active
Healthy and Happy

健體運動示範影片網上播放
Online Broadcast of Physical Fitness Exercise Demonstration Video

The banner features a central graphic of a house with a blue outline, containing several circular images of people engaged in various physical activities: a person swimming, a person doing yoga, a person running, a person in a wheelchair, and a person using a table tennis table. To the left of the house are three more circular images showing people walking, swimming, and running. The background is light blue with green leaf-like shapes on the left and a yellow sunburst on the right containing the date.

Sport England figures show drop in sports activity since London 2012

By David Rhodes
BBC News

16 June 2016

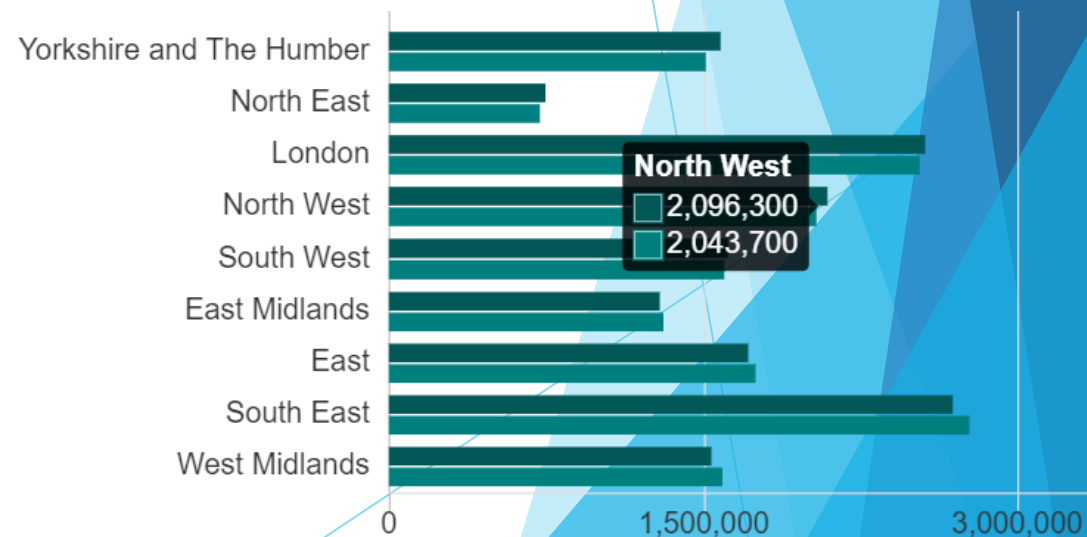
The number of people playing sport in England has fallen since the 2012 London Olympics, despite the Games' pledge to "inspire a generation."

Latest figures show 15.8 million people play sport or exercise at least once week, a drop of 0.4% since 2012.



People playing sport per English region

- Playing sport 2012
- Playing sport 2016



為什麼？ Why ？



- ▶ 1996年 香港奧運第一金 李麗珊
- ▶ 1997, Hong Kong Sports Institute \$23.9 million ;
- ▶ School Children Obesity/Overweight ~12%

- ▶ 2019 Hong Kong Sports Institute - HK\$701.4 million ;
- ▶ School Children Obesity/Overweight > 20%

Research article

Prediction of enjoyment in school physical education

Arto Gråstén¹✉, Timo Jaakkola¹, Jarmo Liukkonen¹, Anthony Watt² and Sami Yli-Piipari³

¹ Department of Sport Sciences, University of Jyväskylä, Finland, ² School of Education, Victoria University, Melbourne, Australia, ³ Department of Kinesiology, University of North Carolina at Greensboro, USA

Abstract

The specific aim of this study was to examine whether motivational climate, perceived physical competence, and exercise motivation predict enjoyment in school physical education within the same sample of adolescents across three years of secondary school. A sample of 639 students (girls = 296, boys = 343) aged between 13- to 15-years at the commencement of the study completed the Intrinsic Motivation Climate in Physical Education Questionnaire, Physical Self-Perception Profile, Physical Education Motivation Scale, and Physical Education Enjoyment Scale. Results derived from path analyses indicated

engagement in both PA and physical education (PE) (Prochaska et al., 2003; Sallis, Prochaska and Taylor, 2000; Wallhead and Buckworth, 2004; Yli-Piipari et al., 2009). The current research was grounded in the self-determination (Deci and Ryan, 1985; 1991; 2000), and achievement goal frameworks (Ames, 1992; Nicholls, 1989), which has been successfully applied to the context of education (Ryan and Deci, 2006; Vallerand, Fortier and Guay, 1997) and recently also in PE (Ntoumanis, 2005; Soini, 2006; Standage, Duda and Ntoumanis, 2005; Yli-Piipari, 2011).

▶ Conclusion: A better understanding of the role of **motivational climate** may assist efforts to promote children's and adolescents' **perceived physical competence, intrinsic motivation, and enjoyment** in the school physical education setting.

中小学体育教学改革与发展的探讨

张镇涛

(东北师范大学体育学院 吉林长春 130000)

摘要:随着社会的不断发展,人们对素质教育的关注度越来越高,中小学体育教育是素质教育不可或缺的重要部分。中小学阶段不仅是学生学习的黄金期,更是他们成才的关键期,所以,在对中小學生实施体育教學的過程中,要以學生個性發展為目標,來增強他們的體質,保障身體健康。筆者針對當前中小學體育教學存在的問題進行簡要分析,提出創新體育教學觀念,供讀者參考,以便促進中小學體育教學的發展。

关键词:中小学体育 教学改革 素质教育

中图分类号:G807.01

文献标识码:A

文章编号:2095-2813(2016)10(a)-0115-02

- ▶ **科學**有效地轉變中小學體育教學的**觀念**,制定正確的教學目標
- ▶ 培養了他們**身體、心理以及社會**的三維健康觀,從而使體育教學可以進行全方位、多層次的發展。
- ▶ 對於體育教學改革而言,要在原有體育教學內容的基礎上,增加一些具有**生活性、趣味性、社會性**的教學內容,給學生製造出一個愉悅的學習氣氛,以便他們的**創新意識和創新能力**得到**有效的培養**。

廣東省《加強學校體育美育勞動教育行動計劃》 普及學生游泳教育工作 (2019)



- ▶ 廣東將大力推動普及學生游泳教育工作，**2020年開始各地將在小學某一個年級（建議四年級）開始開展游泳教育教學。**
- ▶ 要求加強學校體育工作。學校必須開齊開足體育課，小學一二年級每周至少開體育課4節；小學三年級到初中三年級3節；高中一到三年級2節。普通高校本科學生開設不少於144學時（專科生不少於108學時）的體育必修課。
- ▶ **要切實保證中小學生每天一小時校園體育活動。**每天上午統一安排25-30分鐘的大課間體育活動（不含課間休息）。鼓勵中小學校布置體育家庭作業，使學生每天校內校外體育活動時間達到2小時。
- ▶ 針對**游泳教育**，《計劃》也作出了相關要求。各縣級教育行政部門要積極尋求政府支持，通過新（改）建游泳池或協調利用體育部門、住宅小區等社會游泳場地方式，使每縣（區）至少擁有2-3個可供教學訓練使用的游泳池（館）。

體能測試的誤區，體能評分利多於弊？

- ▶ 源於五十年代冷戰：國家戰鬥兵力
- ▶ 根本目的，手段方法，最終點？
- ▶ 考核與評分
- ▶ 體能 = 評分 ???
- ▶ 評分 = 終身運動 ???
- ▶ 高分 = 健康 ???
- ▶ 引起動機和學習興趣 ??
- ▶ 引起終身運動
- ▶ 例如: **sit up** 仰臥起坐 => 健康層面並不需要狂做鬥多次數，而是全面核心肌群的均稱
- ▶ 體測可以有效引導學生提升全面體適能嗎？



Do fitness test performances predict students' attitudes and emotions toward physical education?

Kelly L. Simonton ^a, Kevin Mercier^b and Alex C. Garn ^a



^aLouisiana State University, Baton Rouge, LA, USA; ^bAdelphi University, Garden City, NY, USA

ABSTRACT

Background: The use of fitness tests in physical education (PE) receives extensive scrutiny and represents one of the most fiercely debated topics in PE research. Fitness test proponents often provide unwavering support citing their positive long-term benefits while critics underscore the corrosive long-term pitfalls associated with their use in PE. In many instances, both proponents and critics alike make these arguments with limited evidence to support their claims. Recently, critics have also highlighted the gendered nature of fitness tests, reporting that overt characteristics of these tests and their implementation create covert messages that reduce girls' motivation toward PE. Therefore, there is a clear need to gather evidence concerning the effects that fitness tests have on students' subjective experiences in PE.




Do fitness test performances predict students' attitudes and emotions toward physical education?

Kelly L. Simonton ^a, Kevin Mercier^b and Alex C. Garn ^a

^aLouisiana State University, Baton Rouge, LA, USA; ^bAdelphi University, Garden City, NY, USA

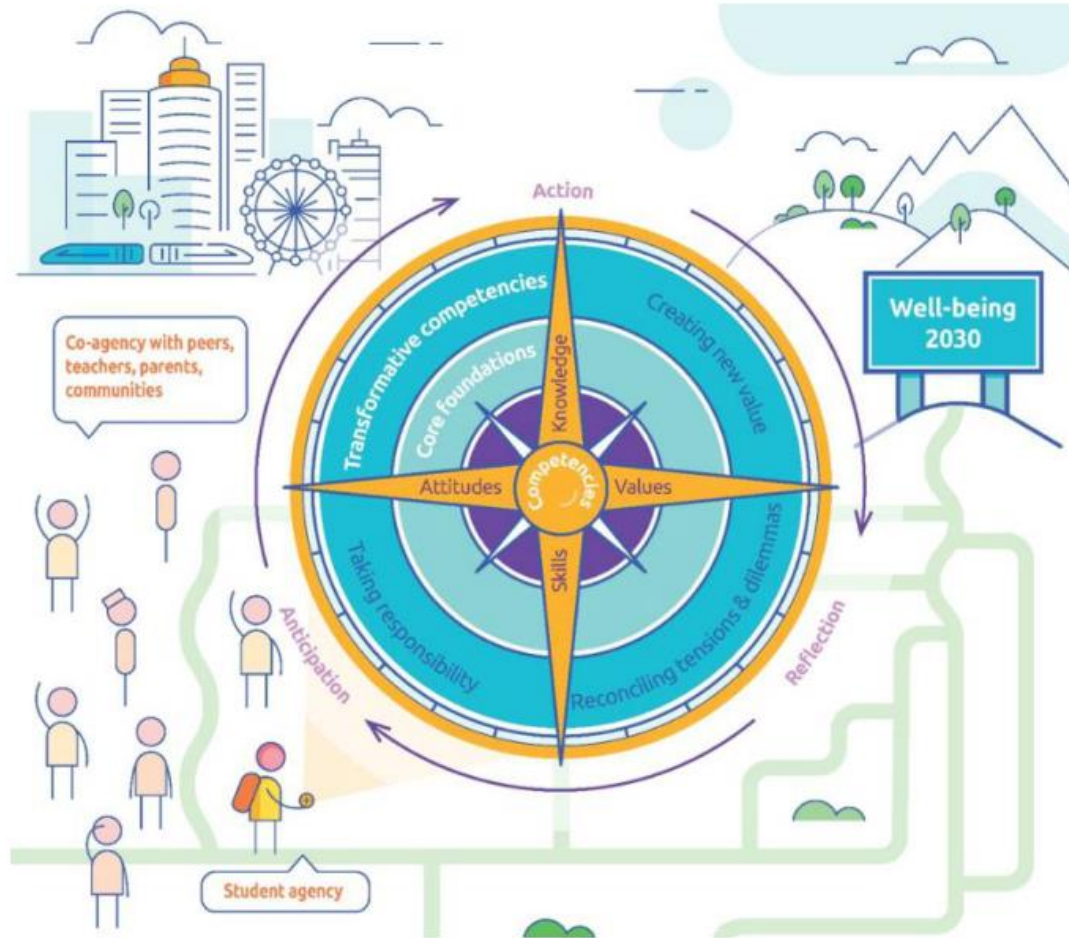
Results: Findings revealed that better PACER performance predicted lower reports of future anger toward PE for both girls and boys. Conversely, increased performance on the curl-up test predicted higher rates of anger and lower rates of enjoyment toward PE. Increased PACER performance also predicted favorable attitudes for boys but not girls while increased sit-and-reach performance predicted favorable attitudes for girls but not boys. It should be noted, however, that fitness test performances explained limited amounts of variance in these outcomes, especially for girls.



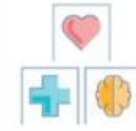
Conclusions: Unlike the common arguments about the valuable or harmful effects of fitness testing, our results suggested these tests had limited associations with students' future attitudes and emotions toward PE. Overall, we remain pessimistic about the use of fitness tests in PE because these PE teachers implemented fitness tests in isolation of the broader PE curriculum. Scores were neither shared with parents/guardians nor used to help students learn about their fitness. Students did not compare their results to previous tests and, to our knowledge, scores were not used for any large-scale surveillance purposes. It remains unclear how fitness test performances relate to student attitudes and emotions toward PE when implemented in a comprehensive and connected manner within the broader curriculum.

未來學校體育發展的方向？

Figure 1.1. Education 2030: Including social, physical and psychological competencies



Core foundations



- Literacy & numeracy
- Social & emotional
- Health
- Digital literacy
- Data literacy

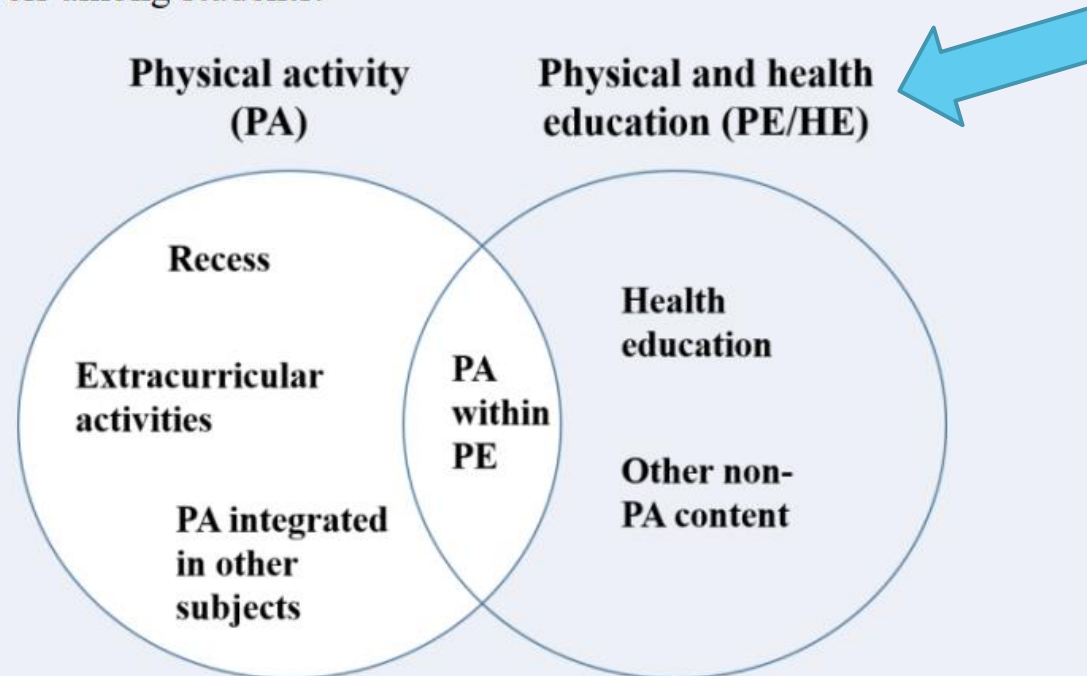
Source: Future of Education and Skills 2030 Learning Compass

(Reference: MAKING PHYSICAL EDUCATION DYNAMIC AND INCLUSIVE FOR 2030 © OECD 2019)



未來學校體育發展的方向？

Lastly, it is important to note that one common concern across participating countries and jurisdictions is to ensure that students reach recommended weekly physical activity levels. Physical activity can take place during physical education, but also at other times, like recess or outside of school. These interactions between PE/HE as a subject and other common fora of physical activity are relevant for policy making. As a result, this report will also touch on these interactions to drive physical activity levels among students.



Source: Education 2030 International Comparative Review of Physical Education questionnaire (2018), Curr1. 4a. A.

Highlights

Physical and health education has the potential to become one of the cornerstones of the education of tomorrow that contributes to the holistic development of students, fostering the development of crucial competencies and the physical and mental health of students.

- ▶ Physical education classes can contribute to making students more “**physically active**” in, outside, and beyond school
- ▶ Appropriate physical education provision can have a strong, positive effect on students’ **social skills and social development**
- ▶ Spending more time in school-based PE/HE classes, and relatively less time on other school subjects **does not adversely affect academic performance**
- ▶ Physical education can affect self-esteem and self-efficacy as well as assist students with severe psychological conditions; good pedagogical approaches are crucial, however
- ▶ PE/HE could be a lever for reducing inequalities in knowledge around dietary and lifestyle habits
- ▶ PE/HE is increasingly becoming an **interdisciplinary subject/learning area**, which puts the promotion of students’ well-being at its core

Highlights:



- ▶ **Inclusiveness** should be kept in mind when redesigning the physical education curriculum
- ▶ There is a move towards **knowledge-rich, competency-based curricula**
- ▶ Addressing curriculum gaps by aligning goals, pedagogies and assessments is important for effective curriculum implementation
- ▶ Valuing teacher agency and teacher well-being is critical to make new curriculum designs a reality
- ▶ Monitoring implementation with a particular focus on student well-being, and piloting new curriculum contents, pedagogies and assessments are important but underused policy levers
- ▶ It is crucial to close the knowledge gap in physical and health education; further research is needed

社區參與：

香港青年協會 **HSBC** Future Skills Development Project
滙豐未來技能培訓計劃

世界急速發展，工作技能的需求亦不斷變遷。創新科技驅動下，人工智能、機器人等嶄新科技產物，以及計算思維和數碼科技等，持續主導全球未來趨勢。

與此同時，溝通技巧和慎思明辨等通用技能亦必須作出調整和配合。世界經濟論壇等國際報告強調，上述轉變對年輕人在全球化經濟中保持競爭力，極為重要。

三大支柱模式 · 提升就業能力： 學校體育如何配合？

- ▶ 理財能力 - 培養理財規劃概念，提升理財能力和知識
- ▶ 未來就業技能 - 增進團隊動力、跨文化溝通技巧和慎思明辨的能力、開拓並廣泛聯繫網絡
- ▶ 創新科技 - 提升未來職業所需的核⼼技能，以應對工作變得機械自動化等挑戰、培訓解難能力、數碼能力和創造力

反思題：本港未來學校體育發展的方向？

- ▶ 競技體育 (校隊比賽) 主導學校內的體育發展？
- ▶ 體育與肥胖及健康行為的協調失衡？
- ▶ 體育教師 vs 運動教練：角色越來越模糊不清？
- ▶ 體育教師自身的迷茫？
- ▶ 家長過份主導校政而忽視體育鍛煉？
- ▶ 學校體育可以配合教育發展嗎？又或是教育發展改變學校體育？

體能活動(Physical Activity) 與醫療開支

The economic burden of physical inactivity: a global analysis of major non-communicable diseases



Ding Ding, Kenny D Lawson, Tracy L Kolbe-Alexander, Eric A Finkelstein, Peter T Katzmarzyk, Willem van Mechelen, Michael Pratt, for the Lancet Physical Activity Series 2 Executive Committee*

Summary

Background The pandemic of physical inactivity is associated with a range of chronic diseases and early deaths. Despite the well documented disease burden, the economic burden of physical inactivity remains unquantified at the global level. A better understanding of the economic burden could help to inform resource prioritisation and motivate efforts to increase levels of physical activity worldwide.

Methods Direct health-care costs, productivity losses, and disability-adjusted life-years (DALYs) attributable to physical inactivity were estimated with standardised methods and the best data available for 142 countries, representing 93·2% of the world's population. Direct health-care costs and DALYs were estimated for coronary heart disease, stroke, type 2 diabetes, breast cancer, and colon cancer attributable to physical inactivity. Productivity losses were estimated with a friction cost approach for physical inactivity related mortality. Analyses were based on national physical inactivity prevalence from available countries, and adjusted population attributable fractions (PAFs) associated with physical inactivity for each disease outcome and all-cause mortality.

Findings Conservatively estimated, physical inactivity cost health-care systems international \$ (INT\$) 53·8 billion worldwide in 2013, of which \$31·2 billion was paid by the public sector, \$12·9 billion by the private sector, and \$9·7 billion by households. In addition, physical inactivity related deaths contribute to \$13·7 billion in productivity losses, and physical inactivity was responsible for 13·4 million DALYs worldwide. High-income countries bear a larger proportion of economic burden (80·8% of health-care costs and 60·4% of indirect costs), whereas low-income and middle-income countries have a larger proportion of the disease burden (75·0% of DALYs). Sensitivity analyses based on less conservative assumptions led to much higher estimates.

Interpretation In addition to morbidity and premature mortality, physical inactivity is responsible for a substantial economic burden. This paper provides further justification to prioritise promotion of regular physical activity worldwide as part of a comprehensive strategy to reduce non-communicable diseases.

Lancet 2016; 388: 1311-24

Published Online

July 27, 2016

[http://dx.doi.org/10.1016/S0140-6736\(16\)30383-X](http://dx.doi.org/10.1016/S0140-6736(16)30383-X)

See **Comment** pages 1254, 1255, 1257, and 1258

See **Articles** page 1302

See **Series** pages 1325 and 1337

This paper forms part of the Physical Activity 2016 Series

*Full list of committee members at end of paper

Prevention Research Collaboration/the Charles Perkins Centre, Sydney School of Public Health, The University of Sydney, Camperdown, NSW, Australia (D Ding PhD); Centre for Chronic Disease Prevention, College of Public Health, Medical and Veterinary Sciences, James Cook University, Cairns, QLD, Australia (D Ding, K D Lawson PhD); Centre for Health Research, School of

The economic burden of physical inactivity: a systematic review and critical appraisal

Ding Ding,^{1,2} Tracy Kolbe-Alexander,^{3,4} Binh Nguyen,¹ Peter T Katzmarzyk,⁵ Michael Pratt,⁶ Kenny D Lawson^{2,7}

► Additional material is published online only. To view please visit the journal online (<http://dx.doi.org/10.1136/bjsports-2016-097385>).

¹Prevention Research Collaboration, Sydney School of Public Health, The University of Sydney, Camperdown, Australia

²Centre for Chronic Disease Prevention, College of Public Health, Medical and Veterinary Sciences, James Cook University, Cairns, Australia

³Department of Human Biology, Research Unit for Exercise Science and Sports Medicine (ESSM), Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa

⁴School of Health and

ABSTRACT

Objective To summarise the literature on the economic burden of physical inactivity in populations, with emphases on appraising the methodologies and providing recommendations for future studies.


Design Systematic review following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines (PROSPERO registration number CRD42016047705).

Data sources Electronic databases for peer-reviewed and grey literature were systematically searched, followed by reference searching and consultation with experts.

Eligibility criteria Studies that examined the economic consequences of physical inactivity in a population/population-based sample, with clearly stated methodologies and at least an abstract/summary written in English.

deaths¹ and costs billions of dollars to societies around the world.² To date, many countries have developed national physical activity plans; however, few have been fully implemented.³ The substantial gap between policy and implementation may be due to a lack of resources, cross-sectoral partnership and clear strategies. Public health responses to address the pandemic of physical inactivity remain inadequate, uncoordinated and underfunded.³

Economic analysis is essential to bridging the policy-implementation gap, increasing political engagement and motivating actions. Around the world, governments are addressing many competing priorities with finite resources. Making an economic case for physical activity may help galvanise public support, inform decision making and prioritise funding allocation to develop and implement interventions to reduce physical inac-



Results Of the 40 eligible studies, 27 focused on direct healthcare costs only, 13 also estimated indirect costs and one study additionally estimated household costs. For direct costs, 23 studies used a population attributable fraction (PAF) approach with estimated healthcare costs attributable to physical inactivity ranging from 0.3% to 4.6% of national healthcare expenditure; 17 studies used an econometric approach, which tended to yield higher estimates than those using a PAF approach. For indirect costs, 10 studies used a human capital approach, two used a friction cost approach and one used a value of a statistical life approach. Overall, estimates varied substantially, even within the same country, depending on analytical approaches, time frame and other methodological considerations.

未來體育教師應該/能夠做什麼呢?



圖1 橫跨三種學與教主要觀點的課堂活動系統。取自高中課程指引—立足現在·創建未來(中四至中六)，課程發展議會，2009。取自http://cd1.edb.hkedcity.net/cd/cns/sscg_web/pdf/cindex.html

「體育 + STEM」 勢在必行

STEM 是代表科學 (Science)、科技 (Technology)、工程 (Engineering) 及數學 (Mathematics) 各英文譯寫的首字母縮略詞。推動 STEM 教育是配合全球的教育趨勢，以裝備學生應對社會及全球因急速的經濟、科學及科技發展所帶來的轉變和挑戰。

在香港現行課程中，STEM 教育是透過科學、科技及數學教育推動。就 2015 年《施政報告》所述，教育局將更新及強化科學、科技及數學課程和學習活動，並加強師資培訓，讓中小學生充分發揮創意潛能。

RESEARCH ARTICLE

Open Access

Applying machine learning to predict future adherence to physical activity programs



Mo Zhou^{1*}, Yoshimi Fukuoka², Ken Goldberg³, Eric Vittinghoff⁴ and Anil Aswani⁵

- ▶ Phone applications in physical education
- ▶ Online videos
- ▶ Virtual classes
- ▶ Gaming systems
- ▶ Monitors and trackers - Pedometers/Heart Rate Monitors/GPS
- ▶ Smartwatches

WORLDWIDE SURVEY OF FITNESS TRENDS

TABLE 2: Top 20 Worldwide Fitness Trends for 2020

Rank	Trend
1	Wearable technology
2	High intensity interval training (HIIT)
3	Group training
4	Training with free weights
5	Personal training

TECHNOLOGY

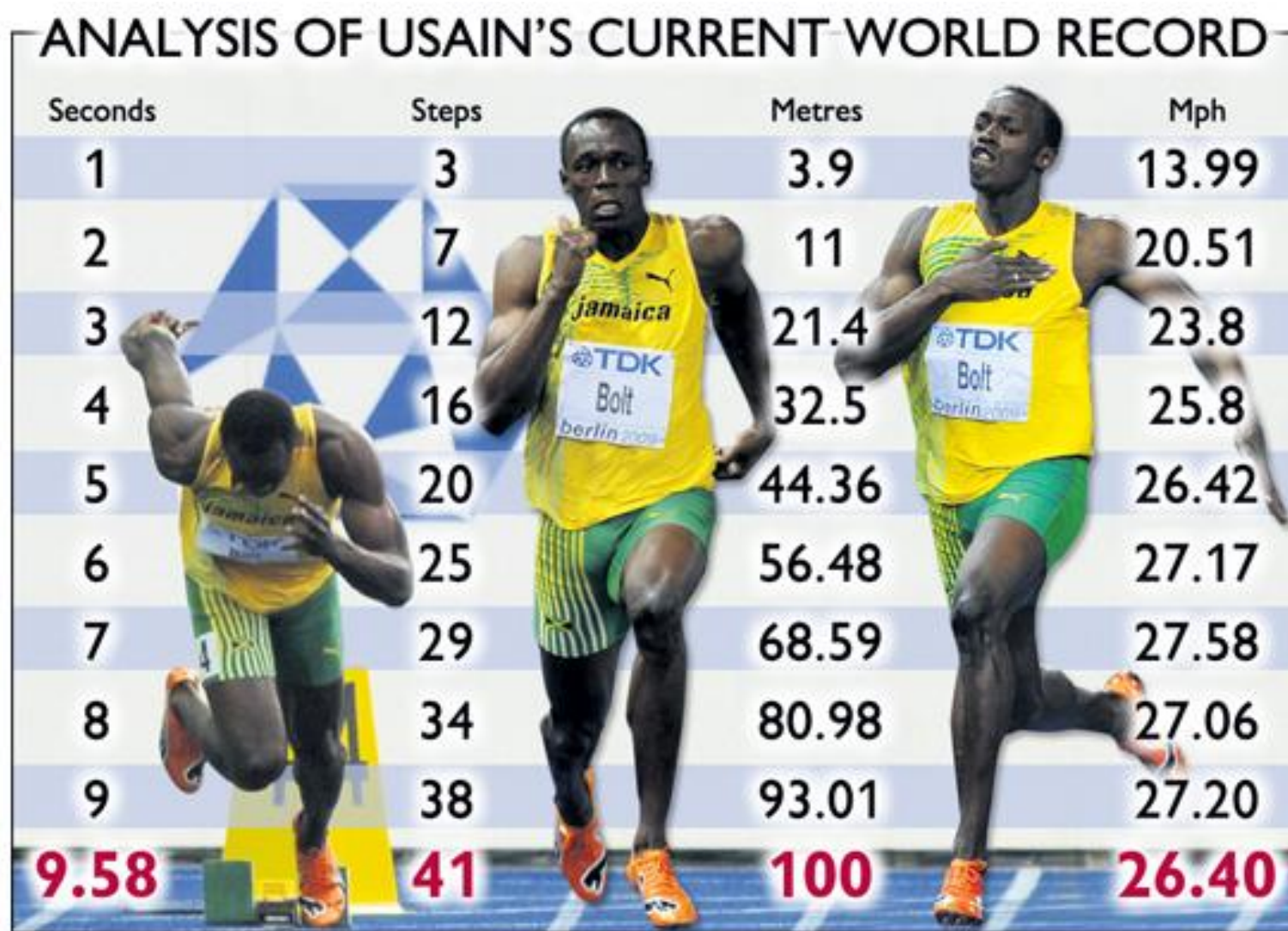
Current Technology Trends and Issues Among Health and Physical Education Professionals

Jennifer M. Krause, Hillary Franks, Brandy Lynch

Data analysis revealed five major themes surrounding the nature of the threads about technology in the forum.

- ▶ Networking and Sharing Resources
- ▶ Implementing Technology for Teaching
- ▶ Data Collection and Management
- ▶ Logistics and Settings
- ▶ Technology Selection

跑步的運動科學



即時坐力反饋陸上划艇機系統

林禮佳, 朱柏強, 張百鳴, 白勵
香港體育學院

簡介

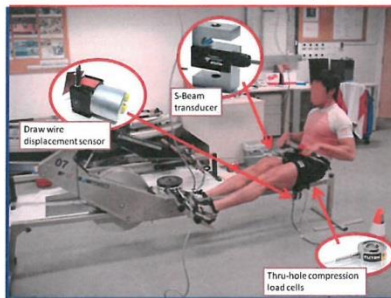
即時反饋系統已被廣泛應用於日常訓練及技術測試。它為教練員和運動員提供量化運動表現數據進行科學分析一個包含了感測、視訊及聲音反饋的綜合系統有助教練員提出即時的指導, 讓運動員更了解自己的運動表現。划艇運動員在整個划槳週期中的拉槳初期, 如果懂得利用身體重量再配合兩腿蹬伸動作, 讓整個身體有懸掛在槳柄和腳踏踏板上, 使體重和腿部力量通過手及腿傳到槳葉, 從而提升拉槳力量, 對製造強而有力的拉槳動作非常重要。一些划艇運動員在訓練或比賽過程中, 可能因為個人技術或身體疲憊等問題, 不能有效利用身體重量製造有效的拉槳動力。我們可以通过收集運動員向下坐力的數據, 具體反映運動員身體重量懸掛空中和自然下墜到座位的情況。因此, 一套可量化划艇運動員向下坐力的系統可以為教練員及運動員在訓練期間提供即時的反饋。期望運動員可以透過該系統, 學習控制身體重量以完善每一個划槳週期。

目的

本計劃的目的旨在陸上划艇機開發及安裝一套具有即時反饋功能的向下坐力感測系統, 為運動員和教練員提供即時的數據反饋。

研究方法

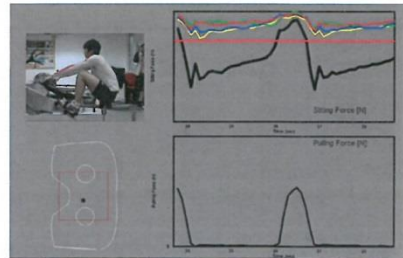
研究員邀請十四名划艇運動員進行了數據取樣測試。測試的內容是要求運動員在 Rowperfect 陸上划艇機上連續進行四種不同類型的划槳練習, 包括每分鐘 20、24、28 及 32 槳。研究員在陸上划艇機 [圖一] 裝上感測裝置, 包括四組 Futek LTH300 壓力儀, 一組 Transducer Technology SBO-1K S-Beam 拉力儀及一組 Micro-epsilon WDS-1500-P96-SR-U 拉線式距離感測儀, 分別收集各項數據, 包括向下坐力、拉力及蹬伸距離。感測系統會以 Arduino 電路開發板作為平台, 將各類型的感測元件接合集中在一起。利用電路開發板上, 合共六組擁有 10 bit 分辨率的類比數位轉換器 (Analog-to-Digital Converter, ADC) 讀取電壓訊號。將電壓訊號以每秒 100 週次的取樣頻率轉化成模擬數碼訊號, 再經由通用序列匯流排埠 (Universal Serial Bus, USB) 傳送到一台配備 Intel i5 1.8GHz 中央處理器的筆記簿型電腦。與此同時, 為了可以讓教練員更容易掌握運動員的實際動作, 研究員把一部網路攝影機連接到電腦, 給教練員提供簡單、即時的影像作為參考。再利用 Processing2+ 軟件把收集到的感測數據轉化成容易明白的、可以讓教練員作分析的型態, 例如圖表及坐標等。



圖一 即時反饋系統

結果和討論

是次研究假設各種感測儀器的安裝及運作沒有對陸上划艇機原有的功能造成影響。在感測系統的協助下, 研究員能夠透過電腦介面 [圖二] 即時向教練員及運動員提供四種不同類型的資訊。當中包括一、與數據同步的影像; 二、垂直向下的坐力; 三、身體重心投射到座位的坐標; 四、拉槳拉力。划艇運動員在整個划槳週期中的拉槳初期, 利用身體重量配合兩腿蹬伸, 減少身體向下的坐力, 做出整個身體有懸掛在槳柄和腳踏踏板上, 達到提升拉槳力量的目的。從圖二右上的圖表, 黑色粗線的資訊, 我們可以得知運動員的向下坐力, 從而反映出運動員利用身體重量提升拉槳力量的技術。與此同時, 左下方的座位中的黑點, 反映出身體重心投射到座位的坐標。此外, 透過理解黑點坐標前後及或左右的移動範圍, 我們除了可以量化運動員的身體於划槳週期期間的穩定性, 還可以取得更多幫助了解拉槳過程的線索。



圖二 數據顯示在電腦螢幕上顯示

總結和建議

我們可以利用一套具有即時反饋功能的向下坐力感測系統, 為划艇運動員在不同階段的訓練中提供即時的量化分析。划艇隊甚至可以利用分析結果, 了解不同運動員的拉槳特徵, 從而找出除制比賽的出賽運動員組合。我們建議改良感測系統: 包括一、增加錄製影像的速度, 由現在每秒錄製 2 幀, 增加到每秒錄製 25 幀以上; 二、添置量度腳踏力的儀器, 用作量化運動員的腳部蹬伸力量, 並且用來決定拉槳週期的起始時刻; 三、編製一個離線用的重播軟件, 用作重溫運動表現。

參考文獻

- Caplan, N., & Gardner, T.N. (2005). The influence of stretcher height on the mechanical effectiveness of rowing. *Journal of Applied Biomechanics*, 21, 286-296.
- Kleshnev, V. (2011). Five factors affecting force at the seat. *Rowing Biomechanics Newsletter*, Vol. 11: 120.
- Kleshnev, V. (2013). Vertical seat force. *Rowing Biomechanics Newsletter*, Vol. 13: 145.
- Kleshnev, V. (2013). Rower's mass suspension. *Rowing Biomechanics Newsletter*, Vol. 13: 149.
- van Soest, A.J. "Knoek" & Hofenijster, M. (2009). Strapping rowers to their sliding seat improves performance during the start of ergometer rowing. *Journal of Sports Sciences*, 27(3): 283-289.
- 張清, 張國雄 (1999). 《中國體育教練員輪訓教材- 划艇》; 中國國家體育局編。

游泳速度快速反饋儀器

林禮佳, 朱柏強, 張百鳴
香港體育學院

簡介

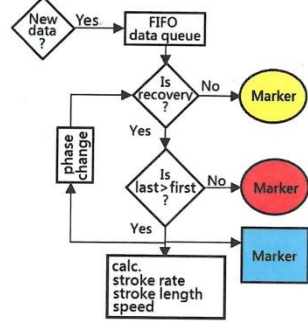
游泳划幅、划頻及速度是生物力學上基本的訓練反饋參數。利用影像分析法來取得相關的游泳數據, 是運動生物力學領域中常用方法。但是, 影像分析法往往需要在訓練後, 進行額外工序來處理數據。這便對游泳速度的即時反饋產生限制。在 2003 年, Bideau 提出了一種主動牽引式的阻力評估系統 (A.D.E.S.), 其引入了用於量度游泳速度的監測裝置。然而, 該系統沒有提供自動判斷游泳週期的解決方案。在本研究中, 我們提出了一個先入先出 (FIFO) 運作模式的數據隊列來識別游泳週期的檢測算法。藉此, 可以快速確定游泳划幅、划頻及速度並即時向游泳運動員顯示。

研究方法

基於 A.D.E.S. 的方案, 我們實踐了一個拉線式速度監控設備, 測試其間安裝在游泳池起跳樓旁邊 [圖一]。這是一個包括自由滾動的捲軸, 激光束中斷觸發模塊及 Arduino UNO R3 的一體化硬件, 時間分辨率可達到百萬分之一秒設備。游泳運動員被繫上一條既輕量又纖細的非彈性尼龍繩池線。運動員向前游泳時會帶動捲軸旋轉, 透過量度游泳運動員拉動捲軸滾動速度, 就可以反映出他們的游泳速度。然後將速度和時間數據流, 傳輸到計算機進行即時分析。



圖一 拉線式速度監控設備的外形及其架設



圖二 游泳恢復階段中, 自動游泳週期檢測算法

在系統中實現了自動游泳週期檢測算法。該算法是基於每一游泳週期, 大致存在著兩大不同游泳階段的現象, 即在恢復階段, 游泳速度呈下降趨勢。相反, 在推進階段, 游泳速度呈上升趨勢。該算法的原理是在數據隊列中, 利用最後的游泳速度和最早的游泳速度, 兩者進行實時比較, 以識別游泳階段的轉變 [圖二]。從而, 得出以每一游泳週期分段為基礎的速度相對時間曲線。

一名香港精英游泳 (蛙泳) 運動員參加了數據驗證測試。要求她在一個 25 米游泳池, 以 3 組不同的游泳策略進行 25 米游泳測試。每秒 50 幀的 Sony HDR-CX550 攝像機置於觀眾席進行拍攝, 覆蓋範圍最少 3 個連續的游泳週期的片段。影像由 Dartfish 7.0 運動分析軟件處理, 計算游泳划幅、划頻及速度。同時, 游泳速度監測設備會通過 Arduino UNO R3 介面板收集速度和時間數據, 然後傳輸到 Intel i5 1.8GHz CPU 筆記本電腦。數據隊列表長度設定為 28。

結果和討論

表一中顯示了利用兩種不同方法所得出的游泳划幅、划頻及速度。兩者差異的平均值及其最大標準偏差分別為 0.01±0.03 (1/秒), -0.02±0.06 (米) 和 0.00±0.03 (米/秒)。與影像分析法相比, 從游泳速度監測裝置產生的對應結果存在 4.23%, 2.91% 和 1.84% 的差異。

表一 影像分析法及拉線式速度監控設備的游泳數據的比較

組	划幅 (1/秒)			划頻 (米)			速度 (米/秒)		
	裝置	影像	差	裝置	影像	差	裝置	影像	差
1	0.59	0.61	-0.02	1.97	1.95	0.02	1.16	1.19	-0.03
	0.63	0.61	0.02	1.86	1.87	-0.01	1.17	1.14	0.03
	0.60	0.63	-0.03	1.91	1.82	0.09	1.15	1.15	-0.01
2	0.61	0.60	0.01	1.91	1.95	-0.04	1.17	1.17	-0.01
	0.67	0.63	0.04	1.81	1.89	-0.08	1.21	1.18	0.03
	0.65	0.62	0.03	1.81	1.85	-0.04	1.18	1.16	0.02
3	0.76	0.79	-0.03	1.70	1.66	0.04	1.29	1.32	-0.03
	0.80	0.76	0.04	1.59	1.71	-0.12	1.27	1.30	-0.02
	0.80	0.77	0.03	1.59	1.62	-0.03	1.27	1.25	0.03

總結和建議

為了更快地提供游泳划幅、划頻及速度數據反饋給運動員, 我們建立了游泳速度監測裝置的初型, 並且引入了簡單但有效的游泳週期檢測算法。然而, 數據隊列表長度的選擇是關鍵的, 需要進一步微調以獲得最佳結果。同樣的方法可應用於其他項目的運動週期檢測, 例如騎行中的膝關節角度變化, 自動推測出腳踏曲柄的轉動頻率等。

參考文獻

- Bideau, B. "Development of an active Drag Evaluation System (A.D.E.S.)." In J. C. Chatard (Ed.), *Biomechanics and medicine in swimming IX* (pp. 51-56). Publications de l'Université de Saint Etienne, France.

運動生理學 與 太空

Space physiology and Health

Issues and Future Trends in Teaching Physical Education: A Preliminary Study

Lee Boon Kiat
Department of Educational Sciences,
Mathematics and
Creative Multimedia, Faculty of
Education
Universiti Teknologi Malaysia
81310 Johor Malaysia
boonkiatlee2000@yahoo.com

Noor Dayana Abd Halim
Department of Educational Sciences,
Mathematics and
Creative Multimedia, Faculty of
Education
Universiti Teknologi Malaysia
81310 Johor Malaysia
noordayana@utm.my

Halijah Binti Ibrahim
Department of Education Foundation
and Social Science, Faculty of
Education
Universiti Teknologi Malaysia
81310 Johor Malaysia
p-halija@utm.my

- ▶ Researcher analyzed the transcript and identified four issues which are **time constrain, teaching method, students' perception toward physical education and future trend in physical education.**
- ▶ There is limited time for teachers to teach all the required topics during the physical education lesson and teacher needs to use the correct teaching method to teach the students in the allocated time. Unfortunately, the teachers still use the traditional method and a lot of time is used in dissemination of knowledge.
- ▶ **Mobile learning** is a trend and previous studies show that mobile learning enables to change the classroom environment. Although mobile learning shows a positive impact in the teaching and learning process, the learning module also has an important role.
- ▶ The researcher suggests that a **digital application** should be developed to replace the tangible textbook. The digital textbook that developed in the future should include the multimedia element that can attract and encourage students' interest to further study in this subject.

電競

二
二

運動?



大學體育本科課程的未來發展與影響

- ▶ 大學教育商品化衍生的問題？
- ▶ 各大學追求世界排名，只著重研究而忽略教學本質？
- ▶ 大學體育本科生的運動技能？
- ▶ 場地設施及管理不利體育本科生鍛煉？
- ▶ 大學體育本科生運動受傷及支援，例如十字韌帶斷裂
- ▶ 理論課時 vs 技能學習
- ▶ 體育 vs 健康 vs 運動科學

內容

- ▶ 文獻回顧：什麼是體育？
- ▶ 體育教學的發展
- ▶ 體育教師的教學能力
- ▶ 體育、教育與科學可以合一嗎？
- ▶ 學校體育的現況、局限與未來：
 - 競技運動 vs 全民健身(MVPA60)
 - 體育教學 vs 運動訓練
 - 體能評分利多於弊？
- ▶ 未來的發展方向：
 - 與世界接軌
 - 教育商品化
 - 體能活動(Physical Activity) 與醫療開支
 - 個人 vs 社會

學校體育：「多元化知識學習」及「趣味性」為主導發展方向

Q & A