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**HEALTH, PHYSICAL ACTIVITY AND FITNESS  
MONITORING WITHIN THE SECONDARY PHYSICAL  
EDUCATION CURRICULUM IN ENGLAND**

by

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## ABSTRACT

**Aims:** The aims of this study are three-fold: to review the worldwide literature on monitoring the health, physical activity and fitness of young people; to determine the purpose and prevalence of the monitoring of young people's health, physical activity and fitness within secondary PE school curricula in England and to explore the factors affecting teachers' views of and approaches to such monitoring; and to propose recommendations for monitoring health, physical activity and fitness within secondary school PE curricula in England which may have relevance and applicability to the Taiwanese context. **Methods:** The research design involved the integration of quantitative and qualitative methods, including a national survey of selected state secondary schools and interviewing a sample of Head of PE department (HoPE). Descriptive statistics and Chi-Square analysis were employed to analysis quantitative data of the prevalence of monitoring pupils' health, physical activity or fitness within school curriculum, and to exam the homogeneity of HoPEs' attitudes and views (agree v.s disagree) towards specific statements with different gender, and teaching experience. The significant level of Chi-square is .05. Coding and thematic analysis were employed to analysis qualitative data. **Results:** 118 schools (38.4%) returned the questionnaires and 12 teachers were interviewed. The proportion of schools which monitored pupils' health, physical activity and fitness was 39%, 61.9%, and 89.0% respectively. The interview data revealed issues including purpose and value of monitoring; responsibility and accountability; pupils' responses; teachers' conceptual confusion, and resource limitations. **Recommendations:** Nine recommendations were proposed including: (1) physical educators should broaden their monitoring approach beyond fitness; (2) formal guidance on monitoring within the PE school curriculum should be produced; (3) teachers should be offered continuing professional

development on this topic; (4) PE teachers should be encourage to employ simply, manageable monitoring methods; (5) health benefits of physical activity and physical activity promotion should be weighted through monitoring processes; (6) PE teachers should realise that the processes of monitoring health, physical activity and fitness are appropriate contexts for learning; (7) it is unnecessary to make comparisons between students or against standardized norms; (8) teachers should aim to personalise monitoring procedures and ensure that pupils' experience of monitoring is positive; (9) PE teachers should encourage and teach children self-monitor skills to develop their independence and self- management skills. An example formal guidance for key stage 3 on monitoring health, physical activity and fitness within the PE curriculum has been proposed to help PE teachers broaden their approaches on monitoring and present them a range of implementation example.

**Key words:** monitoring, health, physical activity, fitness, HoPE, PE curriculum

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## **Chapter 1: Introduction**

### **1.1 The Research Proposal**

#### **1.1.1 Introduction**

Over recent decades, physical education (PE) curricula in schools have evolved from a predominant focus on teaching sports skills, to one which includes the cultivation of health behaviours and attitudes (Kirk, 1988). Over time, schools have begun to place more emphasis on health promotion, health-related fitness and physical activity promotion (Cardon & Bourdeaudhuij, 2002; Fairclough et al., 2002; Fox et al., 2004; McBride & Midford, 1999b; Sallis & Owen, 1999) and specifically school PE has been recognized as having a key role to play in activity and health promotion (Cale, 2000; Cardon & Bourdeaudhuij, 2002; Harris & Cale, 2007; McBride & Midford, 1999a; McKenzie, 2001b; Sallis & Owen, 1999; Shephard & Trudeau, 2000). However, diversification, innovation and evolution of the PE curriculum has presented a number of challenges for physical educators. For example, although on the face of it, it would seem that monitoring the health, physical activity and fitness of pupils could provide useful information to help improve the general well-being of young people, there are numerous issues associated with such monitoring which require careful consideration (Cale & Harris, 2005).

In this section, definitions of key terms associated with health, physical activity and fitness monitoring are considered and a background to the study is presented.

##### **1.1.1.1 Health and Health Education**

The most recent definition of 'health' from the World Health Organisation (WHO) (1986) states that it is a resource for everyday life, not the objective of living, and a

positive concept emphasizing social and personal resources, as well as physical capacities. Health education is defined as any intentional activity which is designed to achieve health or illness related learning (Tones & Tilford, 1994, p.11).

It is considered that health and physical educators in schools should be responsible for helping pupils to understand that physical activity has a beneficial impact on their physical health (e.g. on bone mass, blood lipid, blood pressure, body weight) as well as on their mental health (Cale & Harris, 2005a; Harris, 2000). Monitoring aspects of pupils' health within the school curriculum could potentially be useful in developing their understanding of their own health status and in promoting positive health behaviours.

#### **1.1.1.2 Physical Activity**

Physical activity has been defined as any bodily movement produced by skeletal muscles which results in energy expenditure (Caspersen et al., 1985). Physical activity is a broadly used term which incorporates components such as the type, intensity, duration and frequency of the activity, and the amount of energy spent. Due to the range of possible health benefits of physical activity, young people have been encouraged to be active to optimize their health, develop new habits, improve their lifestyle and reduce morbidity (Cavill et al., 2001). Furthermore, physical inactivity has been highlighted as a major risk factor for coronary heart disease (Wannamethee & Shaper, 2001; Williams, 2001). Physical activity has been identified as a leading health indicator in Healthy People 2010. The recommended amount of physical activity for children and young people has been identified as one hour per day of activity of at least moderate intensity (Health Education Authority (HEA), 1998).

Monitoring young people's physical activity in the school curriculum could help them, potentially, realise how active or inactive they are, whether or not they are

meeting current recommendations, and also help develop their knowledge and understanding of the benefits of being active.

### **1.1.1.3 Fitness**

Fitness is defined as a capacity that individuals have or achieve that enables them to participate in and benefit from physical activity (Caspersen et al., 1985). Physical fitness has health-related components which are associated with health conditions, and skill-related components which are associated with athletic performance. Health-related fitness refers to an ability to perform daily activities with vigor, to demonstrate traits and capacities which are associated with low risk of premature development of hypokinetic diseases, and a fitness base to participate in a variety of physical activities (Pate, 1988). Health-related fitness incorporates the physical and mental dimensions of fitness that are considered to have implications for health such as reduced risk of coronary heart disease, back pain, osteoporosis, obesity, depression and anxiety (Harris, 2000). The American College of Sports Medicine (ACSM) (1988) stated that it is important throughout life to develop and maintain basic fitness capability to meet the demands of living and to promote optimal health.

The health-related components of fitness are cardiorespiratory endurance, muscular endurance, muscular strength, flexibility, and body composition (Armstrong & Mechelen, 1998). Cardiorespiratory fitness refers to the ability of the cardiac, circulatory, and pulmonary systems to pump blood and supply fuel and eliminate waste products throughout the body during exercise (Armstrong & Welsman, 1997c; Harris, 2000). Muscular fitness comprises muscular strength which is the ability of a muscle group to exert force against a resistance in one maximal effort, and muscular endurance which is the ability of a muscle group to perform repeated contractions against a light load for an extended period of time (Armstrong & Welsman, 1997b).

Flexibility is the ability to move joints freely and without pain through a wide range of motion (ACSM, 2006). Body composition refers to the relative percentage of body weight that is fat and fat-free tissue (ACSM, 2006). Mental fitness comprises a number of aspects such as coping with the stress that inhibits an individual from being healthy, happy, and well adjusted (Harris, 2000). On the other hand, the main skill-related components of fitness are power, speed, agility, balance, reaction-time and co-ordination (Gallahue, 1982) but it can also include mental aspects such as concentration and determination (Harris, 2000).

Fitness testing has attracted interest from government ministers, teachers, parents and the media (Corbin, 2002). However, the purpose and value of fitness testing within the PE curriculum has been debated for years, and the appropriateness, validity, and reliability of some fitness tests, especially for children, have been questioned (see Harris & Cale, 2006). Further, a number of paradoxes relating to fitness testing have been reported (Corbin & Pangrazi, 1992; Freedson & Rowland, 1992; Shephard & Lavallee, 1994). Nevertheless, if appropriately utilised, it is considered that fitness testing could trigger a behavioural change in children encouraging them to engage in regular physical activity (Cale & Harris, 2005a).

### **1.1.2 What is the Rationale for this Study?**

The literature suggests that monitoring young people's health, physical activity and fitness could be useful in the promotion of a healthy, active lifestyle. However, to date, little research has been conducted on the prevalence and purpose of such monitoring in schools. In particular, there has been limited attention to monitoring procedures designed to meet National Curriculum requirements (Department of Education and Employment and the Qualifications and Curriculum Authority (DfEE/QCA), 1999a) and to addressing the current issues and concerns relating to monitoring pupils' health,

physical activity and fitness within the PE curriculum. It was, therefore, considered relevant to research the prevalence and purpose of monitoring pupils' health, physical activity and fitness within the school PE curriculum and to propose recommendations relating to these. In addition, it was hoped that the outcomes of the research would help contribute to debates about the role of physical education in public health.

## **1.2 The Social Context in Taiwan Relating to this Study**

The history of education in Taiwan can be traced back to the Dutch period (1627), the Confucius Taixue Academy during the Ming Zheng period of the Qing dynasty (1661), the Public School system during the Japanese rule (1895-1948), and the Nine-Year Compulsory Education policy advocated by the government of the Republic of China (1968). The early educational system in Taiwan was deeply influenced by Japanese culture, and then by the subsequent Chinese culture after Japan ended its governance (Ho et al., 2009). It has been suggested that the continued suppression of local culture and education in Taiwan has resulted in the absence of an educational system purposely and specifically tailored to the needs of Taiwanese students (Ho et al., 2009; <http://history.moe.gov.tw/index.asp>).

Since the Japanese governance, the school curriculum in Taiwan has been revised six times since 1952 (Lin & Lou, 2003). During the twenty years between the fourth and fifth versions (the latter being in 1993), economic development in Taiwan brought about diverse international and cultural changes. This led to the school curriculum being considered out-of-date and incapable of satisfying the requirements and developments of the new generation (Lin & Lou, 2003). Consequently, the fifth revision of the curriculum focused mainly on peer interaction, leadership, life adaptability, and knowledge about life throughout the whole curriculum. This revision not only matched the social democratization and rebuilding of social order, but it also

elaborated on the educational nature of education. It included a 'curriculum standard' within which the subjects and the pedagogies were determined, and schools had limited freedom to organise subjects and the school timetable. However, after six years of implementation, it was found that the 'old' curriculum continued to overshadow the 'new' as most teachers were accustomed to the former and were reluctant to implement the new vision. Thus, the great innovation intended by the new curriculum failed to be effective in practice due to its low rate of uptake or implementation (Lin & Lou, 2003).

A sixth new curriculum innovation entitled 'Grade 1-9 Curriculum' was announced in 1998 and implemented in 2001. The characteristics of this included curriculum integration, alternative learning and team teaching. It focused on the improvement of pupils' knowledge and the integration of ability. This represented a change from the traditional discipline organisation, and focused on learning territories instead of separate disciplines. The following five basic aspects are emphasized and included in the Grade 1-9 Curriculum designed for the new century: developing humanitarian attitudes, enhancing integration ability, cultivating democratic literacy, fostering both indigenous awareness and a global perspective, and building capacity for lifelong learning. The core components of each aspect are as follows:

- A. 'Humanitarian attitudes' include self-understanding and respect for others and different cultures.
- B. 'Integration ability' includes harmonizing sense with sensibility, a balance between theory and practice, and integrating human sciences with technology.
- C. 'Democratic literacy' includes self-expression, independent thinking, social communication, tolerance for different opinions, team work, social service, and a respect for the law.
- D. 'Indigenous awareness and a global perspective' include a love for one's homeland

patriotism, and a global perspective (both culturally and ecologically).

E. 'Capacity for lifelong learning' includes active exploration, problem solving, and the utilization of information and languages ([www.edu.tw](http://www.edu.tw)).

In order to foster core competences in citizens, the curriculum for elementary and junior high school education emphasises three dimensions: individual development, community and culture, and natural environment. Thus, the Grade 1-9 Curriculum encompasses the following seven major learning areas: Language Arts, Health and Physical Education, Social Studies, Arts and Humanities, Mathematics, Science and Technology, and Integrative Activities.

1. Language Arts includes Mandarin, English, and focuses on listening, speaking, reading and writing of languages, developing basic communication competences, understanding of culture and social customs.
2. Health and Physical Education focuses on mental and physical development and learning about health management, sports and motor skills, healthy environments, fitness and lifestyle choices. This area is of particular interest to this study and will be explored further later.
3. Social studies includes the learning of history and culture, geographical environment, social institutions, morals and norms, politics, economy, interpersonal interactions, civic responsibilities, indigenous education, environmental conservation, and the incorporation of the aforementioned learning into one's daily life.
4. Arts and Humanities includes music instruction, instruction in the visual and performing arts, and aims to help students cultivate an interest for the arts and encourage them to enthusiastically participate in related activities, thus promoting abilities such as imagination, creativity, appreciation for the arts, and other abilities.



5. Science and Technology includes the learning of substances and energy, nature, the environment, ecological conservation, information technology. In addition, it focuses on knowledge and skills of science, research and developing such attitudes as respect for all forms of life, a love of the environment, and the ability to utilize information, as well as applying such knowledge and skills to their daily life.
6. Mathematics includes acquiring the basic concepts of figures, shapes, and quantity, the ability to calculate and organize, and the ability to apply such knowledge and skills in daily life. It also includes comprehending the principles of reasoning and problem-solving, the ability to elaborate clearly on maths-related concepts, and making the appropriate connections among materials and contents between this and other learning areas.
7. Integrative Activities refers to activities which may guide learners to practise, experience, and reflect upon the learning process as well as to testify and apply what has been learned to real situations. This learning area includes courses such as Scouting Activities, Counseling Activities, Home Economics, and Group Activities, which have already been implemented in existing school systems, as well as other separately-arranged learning activities, which resort to link outside educational resources to the school classroom.

These changes were intended to help solve the limitations of teaching disciplines separately, and gave schools more flexibility to arrange their curricula differently.

The new learning area of 'health and physical education' comprised seven main themes: (1) growth and development, (2) humans and food, (3) sports skills, (4) sports participation, (5) safety lifestyle, (6) mental health, and (7) social behaviour ([www.edu.tw](http://www.edu.tw)). The main purpose of combining PE and health was to strengthen the link between the two in order to more successfully achieve the educational target of

enhancing general well-being. However, it proved to be a major challenge for primary and secondary school PE teachers to prepare new teaching materials and there were many issues related to delivering the new subject of 'health and PE' (Lin & Lou, 2003). These included teachers' negative attitudes towards the changes, their inadequate level of professional knowledge to deliver the new curriculum, and the lack of guidance/training given to teachers to integrate health and PE, as required by the curriculum (Lin & Lou, 2003). It was considered that continuing professional development for teachers was needed so that the new vision could be afforded an appropriate level of priority and be effectively delivered (Lin & Lou, 2003).

### **1.2.1 The Significance of this Research to Taiwan**

The educational reforms in Taiwan in recent years have generally taken account of and been influenced by systems and trends in other foreign countries. However, because of the differences in social values and the historical context in Taiwan, the importation of western concepts and ideas generated some controversy. Taking physical fitness as an example, the initial purpose was to include the non-competitive element in physical fitness as a way to motivate students' interest in physical education and then further increase their physical activity participation. However, due to the competitiveness of the educational system in Taiwan, many physical education teachers have used physical fitness testing as a means of assessing pupils' performance in physical education. Thus, due to the difference in values and perceptions, the nature of physical fitness - stimulating interest in sports activity - has been distorted. Some schools have already included physical fitness testing results as one of their entry requirements. Although controversy surrounding the introduction of 'physical fitness testing' has not yet fully surfaced in the current educational system, in the foreseeable future, it is possible that more and more students will be required to

attend extra-curricular courses for 'physical fitness testing.' The resistance from pupils and their parents will likely evoke discussions about the suitability of including fitness testing in schools.

The current 'Grade 1-9 Curriculum' has combined health and physical education into one field, which in theory, indicates that physical education in Taiwan has gradually transformed from competitive physical training to physical health and life time sport cultivation (Ho et al., 2009; Lin & Lou, 2003). The issues associated with monitoring pupils' health, physical activity and fitness within the school curriculum, as identified in the literature, and recommendations to address these, are therefore of relevance to the Taiwanese context. However, there remain concerns in Taiwan about pupils' health, physical activity and fitness and limitations in the ways in which these are addressed in schools. For example, there are issues with the appropriateness of the fitness tests adopted, pupils' lack of knowledge and understanding of health, physical activity and fitness, and PE teachers' limited conceptual understanding of and attitudes towards the new curriculum (Lin & Lou, 2003).

### **1.3 Aims of the Study**

The aims of this study are three-fold:

1. To review the worldwide literature on monitoring the health, physical activity and fitness of young people.
2. To determine the purpose and prevalence of the monitoring of young people's health, physical activity and fitness within the secondary school PE curriculum in England and to explore the factors affecting teachers' views of and approaches to such monitoring.
3. To propose recommendations for monitoring health, physical activity and fitness within the secondary school PE curriculum in England that may have relevance

and applicability to the Taiwanese context.

## Chapter 2: Review of Literature

### 2.1 Introduction

Schools are acknowledged as the primary institution responsible for promoting physical activity in young people (McBride & Midfore, 1999; Sallis & Owen, 1999; Cardon & Bourdeaudhuij, 2002) and school physical education (PE) in particular is recognized as having a key role to play (Cale, 2000; Shephard & Trudeau, 2000; McKenzie, 2001; Green, 2004; Cale & Harris 2005). McKenzie (2001) views PE as the most suitable vehicle for the promotion of active, healthy lifestyles among young people. Clearly, if PE is to be successful in this regard, young people need to be provided with knowledge, understanding and skills required for life-long participation in physical activity along with positive, meaningful and relevant physical activity experiences (Cale & Harris, 2009). Furthermore, physical fitness testing is commonplace within schools and the PE curriculum (Harris, 1995; ACSM, 2000). Advocates claim that fitness testing in schools promotes healthy lifestyles and physical activity, and motivates young people to maintain or enhance their physical fitness or physical activity levels (Whitehead et al., 1990; Pate, 1994). However, an increase in obesity levels is a cause for concern (Kautiainen et al., 2002, Lahti-Koski, 2001). An increase in habitual physical activity is one possible solution to this problem. It is questionable, however, as to whether the PE curriculum and fitness testing serve the purposes for which they are intended, and whether they promote young people's healthy lifestyles and physical activity, motivate young people, and develop the knowledge and skills that are important for sustained engagement in an active lifestyle. It would be important to identify how health, physical activity and fitness education and promotion were implemented within the PE curriculum, and whether PE teachers have the knowledge to deliver effective learning experiences that

incorporate appropriate levels of physical activity. Thus, this study draws on Heads of Physical Education Departments' (HoPEs') perspectives to explore the key facts, issues, concerns and debates regarding health, physical activity and fitness monitoring within the PE curriculum in England, as they relate to encouraging pupils' participation in a physically active lifestyle. Finally, recommendations will be proposed for PE teachers in terms of implementing health, physical activity and fitness monitoring within the PE curriculum in order to promote pupils' engagement in lifelong physical activity.

Prior to analysing and critiquing the monitoring of health, physical activity and fitness within the secondary school PE curriculum in England, and to address the first aim of this study, it was important to review the relevant literature in order to provide a context for the study. Using journal scans and computerized literature database searches, studies were identified that incorporated perspectives central to understanding the multidimensionality of health, physical activity and fitness monitoring. Computerized searches of PsychINFO, Medline, SPORTDiscus, and Physical Education Index through Loughborough University's Metalib search engine were conducted. This focused on the English-language literature and employed the following combination of key terms: health, physical activity, fitness, testing, monitoring, promotion, physical education curriculum, model, approach, young people (and children, youth, adolescent, pupils). In addition to searching for methods of monitoring health, physical activity and fitness from bibliographical literature, this research attempted to explore and critique the applicable teaching approaches/models for monitoring health, physical activity and fitness. The key findings from 1985 onwards with respect to the above areas were summarized. The goal was to formulate pragmatic recommendations for monitoring health, physical activity and fitness within the PE curriculum via the support and critique of related reference materials.

The literature is presented in the following nine sections which emerged from the review:

1. Methods employed to monitor young people's physical and mental health.
2. Methods employed to monitor young people's physical activity levels.
3. Batteries of tests employed to monitor young people's fitness levels from the mid-1980s to the present day.
4. Methods used to monitor young people's health, physical activity and fitness within the school curriculum.
5. Young people's physical activity and fitness levels.
6. Influence of physical activity and fitness on the health of young people.
7. Range of physical education models used in schools.
8. Approaches used to promote the concept of 'total health' to children.
9. Recent evolutions and innovations within school PE in England.

## **2.2 Methods Employed to Monitor Young People's Physical and Mental Health**

Health has multiple biological, social, cultural and political determinants. Over half a century ago, health was defined by the World Health Organization (WHO) as a state of complete physical, mental and social well-being, and not merely the absence of disease and infirmity (WHO, 1948). More recently, health has been viewed as a resource for everyday life, not the objective of living; it is a positive concept emphasizing social and personal resources, as well as physical capacities (WHO, 1986). Ewles and Simnett (1999) further categorized the concept of health into five aspects: (1) physical health which is concerned with the mechanistic function of the body; (2) mental health which is the ability to think clearly and coherently; (3) emotional health which is the ability to recognise emotions such as fear, joy, grief and

anger and to express such emotions appropriately; (4) social health which is the ability to make and maintain relationships with other people; and (5) spiritual health which is connected with religious beliefs and practices.

This study will focus predominantly on the physical and mental aspects of health as outlined in the following two sections of this chapter.

## 2.2.1 Physical Health

Physical health can be measured in a number of ways as summarised in Table 2.1. However, as there are numerous methods of measuring physical health, only those that are considered applicable to the school setting are considered in detail in this section.

Table 2.1 A Summary of Common Methods of Monitoring Physical Health.

Component of Physical Health	Common Measures
Body weight/composition	Hydrostatic weighing Skinfolds measurement Anthropometric method Body mass index (BMI) Bioelectrical impedance analysis (BIA) Near-infrared intercadence
Blood pressure	Auscultator sphygmomanometer and automated auscultator
Cholesterol profiles	Blood sample
Bone mass	Anthropometrics Radiographic Dual energy X-ray absorptiometry (DEXA) Quantitative computed tomography (QCT) Ultrasound
Health-related behaviour	The Health Behaviour in School-Aged Children Survey (HBSC)

### 1. Body Weight/Composition Measuring Methods

Two major health issues associated with young people are excess weight and obesity (Katz, 1997; Plowman, 2005). Obesity prevalence in children and



adolescents appears to be increasing in the United Kingdom (Bundred et al., Rennie & Jebb, 2005; Stamatakis et al., 2005; Wright et al., 2008) and other countries (Jouret et al., 2007; Lobstein et al., 2003; Speiser et al., 2005; Wake et al., 2007). This is a source of concern for three reasons. Firstly, obesity is a major risk factor for insulin resistance and diabetes, hypertension, cancer, gall bladder disease and arteriosclerosis (Eckel & Krauss, 1998; Freedman et al., 1999; Schonfeld-Warden & Warden, 1997; Vanhala et al., 1998); secondly, obesity tends to track into adulthood (Clarke & Lauer, 1993; Dietz, 1998; Maffeis & Tatò, 2001) and thirdly, adults who were obese as children have increased morbidity and mortality, irrespective of their adult weight (Must et al., 1992). Excess weight and obesity during adolescence is considered to be a more significant predictor of a range of future diseases than being overweight and obese as an adult (Boreham & Riddoch, 2001). For these reasons, childhood excess weight and obesity are considered to be an important target for intervention with respect to both prevention and treatment. Regular weight control measurements can be used to monitor childhood obesity (Nielsen & Anderson, 2003). Methods of measuring excess weight and obesity that might be considered applicable to the school setting include:

**Skinfolds and Anthropometric Methods:** these involve the use of prediction models which permit skinfolds measurements (e.g. abdominal, triceps, biceps, chest, medial calf, midaxillary, subscapular, suprailiac, thigh), and body mass index (BMI) or waist-to-hip ratio (WHR) to be related to body composition. Regression equations have been developed to predict body density or body fat percentage from these measurements (ACSM, 2006; Garcia & Zakrajsek, 2000) and several estimation equations have been developed for young people (Caan et al., 1994; Slaughter et al., 1984). BMI is used to assess weight relative to height

and is calculated by dividing body weight in kilograms by height in meters squared ( $\text{kg}/\text{m}^2$ ) (ACSM, 2006). It correlates well with more direct measures of fatness, is simple and inexpensive to use, and the likelihood of misclassification is small because most individuals with high BMI values have excess body fat (Must & Anderson, 2006; Reilly, 2006; Steinberger et al., 2005). Waist circumference is a marker of central body fat accumulation and has been linked to an increased risk of metabolic complications such as type 2 diabetes (Wang et al., 2005). Although standardised methods could be employed to predict body fat, the potential gender-, ethnic-, and maturity-related changes in body composition mean that the relationship between anthropometric measurements and body fat may vary between subgroups (Goran, 1998). Skinfolds provide a better estimate of body fatness than those based only on height, weight and circumferences (Ostojic, 2006). However, a skilled technician is required to improve the accuracy of measurement (ACSM, 2006). Poor technique and/or an inexperienced evaluator, and an improperly calibrated caliper could be factors that contribute to measurement error within skinfold assessment (Rodriquez et al., 2005). Thus, the anthropometric methods including the BMI and WHR are relatively convenient, easily implemented, and may be appropriate for the school setting.

## ***2. Blood Pressure Measuring Methods***

Blood pressure is related to the systolic work of the heart and is measured in a peripheral artery at the level of the heart (Barber, 2000). Auscultator sphygmomanometers and automated auscultator devices are used to measure blood pressure at rest (Kemper, 2000). Various automated devices have been developed to determine blood pressure, which could be employed in the school context, some of which permit young people to measure their own blood pressure under supervision.

### **3. Health-related Behaviour**

Some health surveys have been conducted to investigate young people's health-related behaviour. The Health Behaviour in School-Aged Children Survey (HBSC) (Currie et al., 2004) is one example. The HBSC is a 54-item questionnaire, self-report survey instrument used by the WHO to assess health-relevant behaviours and perceived health status in individuals aged 11-16. It measures health behaviours, lifestyles, as well as how young people perceive health itself.

The core questions in the survey gather information on the following:

- (1) Health related behaviour such as tobacco use, alcohol consumption, medication use, exercise patterns, leisure-time activities, eating patterns, and dental hygiene.
- (2) General perceptions of personal health and well-being and physical ailments.
- (3) Psychological adjustment, including mental health, self-concept, body image, and family relations and support.
- (4) Peer relations and support, including bullying.
- (5) Perceptions of school and its influence.

The sections of the survey include seven subscales: eating and dieting, physical activity, risk behaviours, violence and injuries, peer culture, positive health, and school setting. A total score and seven subscale scores are calculated. These are coded and scored as documented by the WHO study group (Currie et al., 2004).

The questionnaire has been used in 36 countries with country-specific results published by WHO (Yu et al., 2008).

#### **2.2.2 Mental Health**

Aspects of mental health such as self-concept, self-esteem or social anxiety can be evaluated against various scales of references (Tortolero et al., 2000). Only those that are applicable to young people within the school curriculum are considered in

detail here (see Table 2.2).

Table 2.2 A Summary of Common Methods of Monitoring Young People's Mental Health.

Component of Mental Health	Common Measuring Instruments
Self-concept and self-esteem	Piers-Harris II (Piers, 2002) Harter Self-Perception Profile for Children (Harter, 1985) Tennessee Self-Concept Scale-2 (Fitts & Warren, 1996) Physical Self-Description Questionnaire (Marsh et al., 1994)
Loneliness	Asher Loneliness Scale (Asher & Wheeler, 1985)
Body image	Multidimensional Body-Self Relations Questionnaire (MBSRQ) (Cash, 2000).
Self efficacy	Self Efficacy Scale (SES) (Saunders et al., 1997). Physical Self-Efficacy Scale (PSE) (Ryckman et al., 1982).
Anxiety	The Social Anxiety Scale for Adolescents (SAS-A) (La Greca & Lopez, 1998)

### *1. Self-Concept and Self-Esteem*

Several scales have been developed to assess self-concept and self-esteem in young people. For example:

#### *(1) Piers-Harris II (Piers, 2002).*

The Piers-Harris II is a sixty item self-report questionnaire designed for administration to children aged 7-18 years modified from the original 1984 Piers-Harris Children's Concept Scale. The total score is a general measure of the respondent's overall self-concept in six domain scales: Behavioural Adjustment, Intellectual and School Status, Physical Appearance and Attributes, Freedom from Anxiety, Popularity, and Happiness and Satisfaction. The test takes approximately 10-15 minutes to complete. It has acceptable reliability and validity (Holder & Coleman, 2008; Piers, 2002; Yu et al., 2008) and can be administered to an entire class simultaneously.

(2) Harter Self-Perception Profile for Children (SPPC) (Harter, 1985).

The SPPC is one of the most commonly employed measures of self-esteem among youth (Diamantopoulou et al., 2008; Jacobs et al., 2008; Kistner et al., 2007). It consists of 36 items measuring perceived competence and evaluating global self-worth in five areas: scholastic competence, social acceptance, athletic competence, physical appearance and behaviour conduct. Responding to each item is a two-step process. First, participants select which of two statements best describes them. Then, they indicate whether the chosen statement is 'really true for me' or 'sort of true for me'. Items are scored on a 4-point rating scale such that high scores reflect greater self-perceived competence (LaGrange et al., 2008). There are two versions of the SPPC, one for pre-school children and the other for children aged 6-8. As the SPPC is intended for young people, it contains illustrations to encourage completion. The SPPC is considered to be a reliable and valid means of assessing children's self-worth (Mursi et al., 2003).

(3) Tennessee Self-Concept Scale-2 (TSCS:2) (Fitts & Warren, 1996).

The TSCS:2 is an 82-item self-rating scale designed to evaluate total self concept in five areas - body, ethics, personality, family, and social - which can be administered to individuals aged 13-90. Young people can complete the questionnaire by themselves. This scale is not considered suitable for children under twelve years of age (Robinson et al., 1991; Sullivan, 2001).

(4) Physical Self-Description Questionnaire (PSDQ) (Marsh et al., 1994).

The theoretical framework and design of the PSDQ were based on the well-established multi-dimensional Self-Description Questionnaire. The PSDQ contains 70 items designed to measure nine specific components of global physical self-concept (health, coordination, physical activity, body fat,

sports competence, appearance, strength, flexibility, and endurance). Each of the 70 PSDQ items is a simple statement that requires an answer on a 6-point Likert-type scale with answers ranging from 1 to 6. Psychometric properties of the PSDQ have been validated in different countries, including Australia, Spain, and Turkey (Marsh, 1996; Marsh et al., 2002; Marsh et al., 1994). The PSDQ is designed for adolescents aged 12 years or older. It demonstrates acceptable internal reliability, short and long term test-retest reliability, and convergent and discriminator validity with other physical self-concept instruments (Lau et al., 2008; Marsh et al., 2002).

## **2. *Loneliness***

Asher Loneliness Scale (Asher & Wheeler, 1985).

The Asher loneliness Scale was administered to assess adolescents' feelings of loneliness (e.g. 'I have nobody to talk to at school') and social adequacy (e.g. 'It's easy for me to make new friends at school'). Sixteen items were rated on a five-point scale in terms of how true each question was for the individual. Eight items focused on the adolescents' hobbies or preferred activities (Asher & Wheeler, 1985). The validity of the scale is considered to be acceptable (Demir & Tarhan, 2001; Storch & Masia-Warner, 2004).

## **3. *Body image***

Multidimensional Body-Self Relations Questionnaire (MBSRQ) (Cash, 2000).

The MBSRQ is an assessment of self body image intended for use with adolescents (15 years or older) and adults. The full version evaluation criteria include the following: (a) evaluation of appearance; (b) fitness; (c) health/illness; (d) overweight preoccupation; (e) self-classified weight; and (f) the body areas satisfaction scale (BASS) (Cash, 2000).

## **4. *Self-efficacy***

(1) Self-Efficacy Scale (SES) (Saunders et al., 1997).

The SES measures children's self efficacy in physical activity such as the change in their confidence level when facing barriers during physical activities. It evaluates three areas: children's ability to seek support, handle participation barriers, and seek positive alternatives. The reliability of the SES is deemed to be acceptable (Saunders et al., 1997).

(2) Physical Self-Efficacy Scale (PSE) (Ryckman et al., 1982).

The PSE contains two reliable subscales, Physical Self-Presentation Confidence (PSPC) and Perceived Physical Ability (PPA). The ten-item PPA subscale assesses the self-perceived physical ability of children, including areas such as speed, agility, and strength. The PSPC subscale assesses confidence in the social display of physical skills (e.g., in stressful contexts, vocal presentation) (Hu et al., 2005; McAuley & Mihalko, 1998; Ryckman et al., 1982).

5. *Anxiety*

The Social Anxiety Scale for Adolescents (SAS-A) (La Greca & Lopez, 1998)

The SAS-A was used to assess adolescents' subjective experience of social anxiety. Adolescents respond to twenty-two items on a 5-point Likert scale according to how much the item "is true for you" (1= not at all true, 5= all the time"). The SAS-A consists of three factorial derived subscales: Fear of Negative Evaluation (FNE), Social Avoidance and Distress-New (SAD-New), and Social Avoidance and Distress General (SAD-General). FNE reflects fears, concerns, and worries regarding negative evaluations from peers. SAD-New assesses anxiety in and avoidance of new social situations. SAD-General assesses social anxiety or avoidance. Items are added together to compute total and subscale scores with higher scores reflecting greater

social anxiety (Storch & Masia-Warner, 2004).

### **2.2.3 Summary**

A wide range of methods are available to assess physical health, each of which has advantages and disadvantages. For example, with respect to weight/body composition measures, anthropometric methods are relatively quick, simple and inexpensive. Methods which involve specialists to operate equipment are not feasible in a school setting. Anthropometric methods could be employed to monitor pupils' body composition within the school setting, and these methods could be carried out by pupils themselves to help them develop an awareness of their physical health. The self-report questionnaire is considered suitable for a school setting, taking limited time to monitor pupils' health-related behaviour.

With respect to monitoring mental health, the methods outlined in this section are appropriate for use with young people within the school curriculum. These could be used to develop young people's knowledge, understanding and awareness of their mental health. However, more than ten scales were introduced in this section, and each one has its characteristics and specific purpose. There is no one questionnaire that assesses pupils' mental health in all dimensions.

## **2.3 Monitoring Young People's Physical Activity**

Physical activity is a broadly used term that includes habitual activities as well as all forms of sport, exercise and dance. Its heterogeneous nature makes it difficult to characterize and quantify. It has been defined as any bodily movement produced by skeletal muscles which results in energy expenditure (Caspersen et al., 1985). When quantifying physical activity, type, intensity, efficiency, frequency, and energy expenditure can be considered (Goran, 1998).



Within the context of this research, the importance of evaluating physical activity within a population is to establish current levels of physical activity, to determine if levels are appropriate for good health, and to establish the dose-response relationship between activity and health (Lopes et al., 2007).

### **2.3.1 Methods of Monitoring Physical Activity**

More than thirty different methods of assessing physical activity have been identified (Melanson & Freedson, 1996). The literature suggests that the two main ways of determining physical activity are directly measuring the physiological responses of any given physical activity (e.g. motion sensor monitoring, physiological analysis) and recording (directly or indirectly) the physical movements, then deriving or estimating the physiological responses (e.g. self-and/or proxy-report, observation). Different methods which draw on these techniques and which are appropriate for use with children are described and critiqued below.

#### **2.3.1.1 The Self-and/or Proxy-Reporting Method**

Self-report instruments are commonly utilized in studies to evaluate the levels of young people's physical activity (Raudsepp et al., 2008; Sallis, 1991). Depending on their scope, they can provide detailed or general information about physical activity (Raudsepp et al., 2008; Sallis, 1991). Self-report methods include retrospective self-report questionnaires, interview-administered recall questionnaires, activity diaries, mailing surveys, and proxy reports (Cale, 1994; Duncan et al., 2008; Murphy et al., 1988; Noland et al., 1990; Sallis, 1991; Sirard & Pate, 2001; Telama et al., 1985). The data derived from these self-report questionnaires vary, based on the mode, duration, intensity and frequency of the physical activity involved and are also influenced by the duration of the study, and the way in which the physical activity is recorded and summarised (e.g. intensity, frequency, calories expended) (Sallis, 1991).

Self-report methods of monitoring are relatively easy, low cost, convenient and unobtrusive (Baranowski, 1988; Cale, 1994; Pate et al., 2007; Sallis, 1991). It is feasible to use these methods to monitor a large number of children in a research project (Duncan et al., 2008; Sallis, 1991). It can cover details of physical activities over a variable time frame – from previous days to weeks, months or even years - and can be used to measure many different types of physical activity (Cale, 1994; Duncan et al., 2008). It can also ask pupils to report their levels of activity during discrete time periods (e.g., in the morning, during physical education, at lunch, at recess, after school, in the evenings, and on weekends). The ratings on questionnaires provide teachers with valuable information to promote physical activity. For example, if teachers note that youth are not active after school or on weekends, they can report this to parents and encourage them to help their child to be active. If, on the other hand, values are low during recess or other school times, teachers can plan and develop structured opportunities for pupils to be active during these times.

One of the main limitations of self and proxy-reporting methods with children is that they rely on individuals having to recall behavioural information accurately. As a result, the data are often considered to be imprecise due to children's low cognitive ability as their memories decay over time (Cale, 1994; Sallis, 1991). In addition, the sporadic nature and intensity of their physical activity makes it difficult to recall, quantify and categorise (Harro & Ridloch, 2000; Sirard & Pate, 2001). It is also difficult to estimate the different aspects of physical activity, for example the amount of calories spent during a given period of time (Goran, 1998). The data may also be influenced by social pressure or social desirability (Sallis, 1991). It is also considered that children are less time-conscious than adults (Armstrong, 1990; Sallis, 1991) and are less consistent in adequately completing daily diaries (Sirard & Pate, 2001). Additional limitations relate to the problems of definition, failure to account for week

days versus weekend days, and variations in physical activity between different seasons (Cale, 1994). The consensus from several studies shows that conducting 'previous-day recall' in surveys gives the most accurate readings with children (Welk et al., 2000). Self-administered questionnaires are less accurate than interviewer-administered questionnaires, and diaries are considered to be superior to retrospective questionnaires (Armstrong & Welsman, 1997a). The reliability of self-report methods increases with age (Armstrong & Welsman, 1997a; Cale, 1994; Pate, 1993; Sallis, 1991; Sallis et al., 1993; Saris, 1985).

Despite the limitations discussed above, several physical activity and behaviour questionnaires such as the Physical Activity Questionnaire for Adolescents (PAQA (Kowalski et al., 1997), the 3-Day Physical Activity Recall (3DPAR) (Pate et al., 2007; Raudsepp et al., 2008) and the FITNESSGRAM/ ACTIVITYGRAM (The Cooper Institute, 2007) require recalling of activity (Welk et al., 2000) and have time-saving potential (Ridley et al., 2001). The ACTIVITYGRAM assessment is a computerized assessment based conceptually on the well-established PDPAR (Previous Day Physical Activity Recall) format. Children select an intensity category (Rest, Light, Moderate, or Vigorous) and then indicate whether they performed the activity 'Some of the Time', 'Most of the Time', or 'All of the Time'. The computerized format also facilitates accurate recall by preventing children from selecting vigorous for sedentary behaviors or rest for physical activity choices. The ACTIVITYGRAM has been shown to provide good validity when compared with objective data from accelerometers (Welk et al., 2004a; Welk & Morrow, 2008).

### **2.3.1.2 Observation Methods**

Observation techniques are considered to be valid methods of obtaining data about children's physical activity (Welk et al., 2000), as the data are obtained from natural settings and there is minimal interference with the physical activity in progress (McKenzie, 1991). Various instruments for the systematic observation of physical activity have been developed for use in a school setting (e.g. the Children's Physical Activity Form (CPAF)) (O'Hara et al., 1989), SOFIT (McKenzie, 2001b), SOPLAY (McKenzie et al., 2000)), and for general use (e.g. the Children's Activity Rating Scale (CARS) and the Fargo Activity Timesampling Survey (FATS)) (Klesges et al., 1984; Puhl et al., 1990).

Physical activity behaviour can be recorded in hand-written codes or into computers (Pate, 1993) and can be converted into some type of summary score (Kohl et al., 2000). Both independent data (e.g. time, type, intensity) or dependent data (e.g. caloric expenditure) can be obtained through systematic observation. Children's physical activity levels can be reliably monitored with observers trained to record accurate information (Dishman, 2006; Klesges et al., 1984; McKenzie, 1991; Waring et al., 2007; Welk et al., 2000). Another advantage of using observation methods is that the measured data or estimated calorie expenditure can be validated against other methods such as heart rate (Dishman, 2006; Welk et al., 2000).

A considerable amount of time and energy is required to develop the observation system, prepare coding conventions, and train observers (Dollman et al., 2008; Waring et al., 2007). The latter is important as different observers may make different judgments about what they see (Sirard & Pate, 2001). Furthermore, events studied must be observable and code-enabled and are therefore limited to events seen or heard first-hand. Observers need to be present during the observation, thereby limiting the situations where data can be collected (McKenzie, 1991).

It is deemed that further research should consider improving the observational

methodology and careful attention should be paid to training and supervising observers (Welk et al., 2000).

### **2.3.1.3 Motion Sensor Monitoring Methods**

Several mechanical or electronic monitoring devices can be employed to obtain data on children's physical activity.

#### **(A) Movement counters**

Examples of mechanical devices for measuring movement are: the pedometer (Beighle & Pangrazi, 2006; Le Masurier et al., 2005; Welk et al., 2000) and stepcounter (Welk et al., 2000). The advantages of these instruments are that they record physical activity for the user, and they translate the physical activity data into measurable energy expenditure automatically (Cooper, 2003). The instruments are usually small, inexpensive, unobtrusive, non-reactive, objective and reusable (Cooper, 2003; Sirard & Pate, 2001). As a result, they are well-suited for measuring physical activity amongst children (Cooper, 2003; Rowlands et al., 1997). Although recent technological advancements have increased the reliability and validity of these instruments (Bassett et al., 1996; Bassett et al., 2000), extensive validation of them, however, has not been carried out (Cooper, 2003; Freedson, 1991; Saris, 1985). Limitations of the instruments are that they must be worn at all times and not be tampered with by the users. Also, the intensity and duration of the physical activity cannot be determined from the recorded data (Rowlands et al., 1997). Furthermore, these devices are usually limited in their application. For example, a pedometer is only sensitive to physical activity that involves impact (e.g. jogging) and cannot measure 'upper body' activities (e.g. throwing). In addition, it cannot detect likely increases in energy expenditure as a result of, for example, carrying extra weights

during physical activity or walking and running uphill (Cooper, 2003; Rowlands et al., 1997). Many devices however, now include multiple sensors of different measurements and correlate the data from different sensors for a more accurate and complete model of the activities performed.

## **(B) Accelerometers**

The accelerometer has been widely used in physical activity research (Sun et al., 2008; Trost, 2000). It is a sophisticated electronic motion sensor that measures the total amount, frequency and intensity of physical movement in the vertical plane (Armstrong & Welsman, 1997b; Janz et al., 1995), and it can be used to quantify both activity energy expenditure and the physical activity patterns of pupils in a large population (Sun et al., 2008). The device is worn on the arm, leg or hip and measures acceleration and deceleration. A number of accelerometers are available ranging in complexity and cost. Examples of accelerometers are the Caltrac (a single (vertical) plane accelerometer), the Tritrac (a three-dimensional device) and Computer Science Applications (CSA), Actical, Actiwatch (AW), ActiHeart, RT3, and Actigraph. These devices measure quantity and intensity of movement, and store data over many days (Rowlands et al., 1997). However, issues relating to expense tend to prohibit their use in large-scale epidemiological studies (Armstrong & Welsman, 1997b; Freedson, 1991; Riddoch et al., 2004). They are also unable to detect patterns of physical activity (Freedson, 1991; Rowlands et al., 1997; Sirard & Pate, 2001), especially the wide variety and sporadic physical activity patterns engaged in by young people (Sallis et al., 1990; Sirard & Pate, 2001).

Kohl and colleagues (2000) reviewed the reliability and validity of these monitoring methods and proposed that they had moderate to high reliability but low to moderate validity (Kohl et al., 2000; Welk et al., 2004b). Although prediction

equations for energy expenditure of children have been published for the Caltrac, CSA, AW, and RT3 accelerometers (Puyau et al., 2002; Sallis et al., 1990; Sun et al., 2008; Trost et al., 1998), the validity and reliability of these equations still need to be established (Armstrong & Van Mechelen, 1998; Sirard & Pate, 2001).

#### **2.3.1.4 Physiological Monitoring Methods**

Another method of quantifying the physical activity performed by children is to draw conclusions from physiological evidence such as energy intake, expenditure and heart rate.

##### **(A) Energy Intake**

Children's physical activity can be quantified in terms of energy intake and expenditure according to the law of conservation of energy (Armstrong & Welsman, 1997b; Saris, 1985). 'Energy intake' information also cannot be used to estimate physical activity duration, frequency, style and intensity (Puhl, 1989; Saris, 1982). Accurate measurement of habitual food intake remains challenging as it is difficult for children to recall and describe the kinds and amount of food eaten (Armstrong & Welsman, 1997b; Saris, 1985). It is also difficult for parents to recall such information for their children as factors such as memory failure, personal bias, and lack of nutritional knowledge or motivation to monitor energy intake can all affect the accuracy of the 'energy intake' estimation. Furthermore, a child's growth rate should also be taken into account as this consumes a majority of the energy intake (Saris, 1985).

##### **(B) Energy Expenditure**

If daily physical activity is almost entirely aerobic, energy expenditure can be

measured by determining oxygen consumption using Douglas bags (Sujatha et al., 2000) or the doubly labeled water (DLW) technique (Cooper, 2003). With the former technique, subjects are required to wear a facemask or a mouthpiece and a nose clip. This method is not therefore considered suitable for assessing children's physical activity patterns as their activities are usually spontaneous and they are unlikely to be confined in a limited space, to allow them to wear such restrictive instruments for a long period of time (Armstrong & Welsman, 1997b; Saris, 1985).

The doubly labeled water (DLW) technique uses stable isotopes to estimate oxygen consumption and is considered to be the most accurate method for measuring total energy expenditure (Cooper, 2003). It overcomes the restrictions of wearing a facemask or a mouthpiece but requires the subject to drink a glass of isotopic water and provide urine samples to complete the instrumentation. The major advantage of DLW is the ability to quantify the physical activity-related energy expenditure of a subject under free-living conditions over one to two weeks without constant supervision, and it has low interference with daily life (Cooper, 2003; Kohl et al., 2000; Sirard & Pate, 2001; Welk et al., 2000). Furthermore, due to collected data having high accuracy, it can be used as an energy consumption standard for other measurement techniques (Sirard & Pate, 2001; Sun et al., 2008; Welk et al., 2000). The accuracy, relative simplicity and non-invasive nature of the method thus makes it a promising field technique for children, especially for younger ages (Saris, 1985); (Schoeller, 1983). The DLW, however, is high in cost, the collection of multiple urine samples and laboratory visits is burdensome, and analysing the samples is a complex task. For these reasons, the method is not recommended for large scale studies (Kohl et al., 2000; Sirard & Pate, 2001). In addition, both energy expenditure and the doubly labeled water method can only describe the total energy expenditure over a period of time; the pattern, duration, frequency and intensity of physical activity are not



investigated (Armstrong & Welsman, 1997b; Kohl et al., 2000; Saris, 1985; Sirard & Pate, 2001).

### **(C) Heart Rate Monitoring**

One of the most suitable single methods employed to monitor children's physical activity on a large-scale is heart rate monitoring (Livingstone et al., 1992; Luc et al., 2005 ; Saris, 1985; Vanhees, 2005 ). Due to the strong association between heart rate and energy expenditure during exercise, heart rate monitoring has been used to estimate daily physical activity in children as a sole criterion. This method is also used to validate other activity quantification methods (Eston et al., 1998; Livingstone, 1997; Luc et al., 2005; Vanhees, 2005). Several telemetry systems have been developed which involve light weight transmitters fixed to the chest with electrodes which measure heart rate unobtrusively (Saris, 1985). The Polar Sport Tester is a commonly selected heart rate monitor as it is socially acceptable, allows activities to be monitored for a long duration (Armstrong & Welsman, 1997b; Xavier et al., 2006), permits freedom of movement (Leger & Thivierge, 1988; Xavier et al., 2006), and does not influence the child's normal physical activity pattern (Armstrong & Welsman, 1997b; Saris, 1985; Xavier et al., 2006). Heart rate monitors have been found to be reliable and valid with young people (Beghin et al., 2002; Durant et al., 1993; Treiber et al., 1989).

There are, however, several limitations with heart rate monitoring. Firstly, heart rate does not 'track' activities directly, rather it tracks the individual's physiological response to the activity (Cooper, 2003). Secondly, in extreme exercise, the relationship between heart rate and oxygen uptake departs from the normal linear relationship (Armstrong & Welsman, 1997b). Finally, heart rate may be affected by a number of factors such as: different patterns of activity, different types of muscle

contraction, the ambient temperature, state of hydration, food intake, humidity, body position, fatigue, emotional stress, and intensity of training or fitness level (Armstrong & Van Mechelen, 1998; Brage et al., 2005; Danielle & François, 2007; Eston et al., 1998; Melanson & Freedson, 1996; Rowlands et al., 1997; Segerstrom & Nes, 2007; Welk et al., 2000). Hence, the energy expenditure model can only be applied when the heart rate is raised above a certain level and the physical activity has been maintained over a period of time.

### **2.3.1.5 Choosing a Monitoring Method**

Assessing young children's physical activity is problematic because 'physical activity' is a complex phenomenon with numerous dimensions such as volume, duration, frequency, intensity and mode. Physical activities can occur at any time and in any place. Selection of a suitable instrument will be based on the age and size of the sample under investigation, and the respondent burden associated with data acquisition. Tools that provide more accurate information tend to cost more money and are more cumbersome and complex to use. There is no single gold standard method of monitoring physical activity; rather each monitoring method has strengths and weaknesses when employed with young people. Consideration of the relative importance of accuracy or utility is important for selecting physical activity assessments. Clearly, not all the methods introduced above are suitable for the school setting because of the cost, human resource constraints, the pupils' cognitive ability or the instructive nature of the instrument (See Table 2.3 for a comparison of the advantages and disadvantages of the different methods).

Table 2.3 Comparison of Different Types of Physical Activity Assessments (Welk & Wood, 2000)

Type of Assessment	Advantages	Disadvantages
<b>Heart rate monitor</b>	<ol style="list-style-type: none"> <li>1. Accurate indicator of physical activity</li> <li>2. Good educational potential to teach about the cardiovascular system</li> </ol>	<ol style="list-style-type: none"> <li>1. High cost</li> <li>2. Time-intensive to download</li> <li>3. Difficult to assess large number of children</li> <li>4. Relevant only to aerobic activity</li> <li>5. Other factors affect heart rate</li> </ol>
<b>Activity monitor</b>	<ol style="list-style-type: none"> <li>1. Accurate indicator of physical activity</li> <li>2. Good educational potential to teach about “accumulating” activity over the whole day</li> </ol>	<ol style="list-style-type: none"> <li>1. High cost</li> <li>2. Time-intensive to download</li> <li>3. Difficult to assess large number of children</li> </ol>
<b>Pedometer</b>	<ol style="list-style-type: none"> <li>1. Easy to use</li> <li>2. Records distance</li> </ol>	<ol style="list-style-type: none"> <li>1. Records ‘quantity’ of movement but not ‘quality’ of movement</li> </ol>
<b>Observation</b>	<ol style="list-style-type: none"> <li>1. Provides quantitative and qualitative information about physical activity, including type, frequency, and duration.</li> </ol>	<ol style="list-style-type: none"> <li>1. Requires trained observers</li> <li>2. Can only track several students at a time</li> <li>3. Is very time consuming</li> </ol>
<b>Self-report</b>	<ol style="list-style-type: none"> <li>1. Low-cost</li> <li>2. Easy to administer to large groups</li> <li>3. Good educational potential for use in curriculum</li> </ol>	<ol style="list-style-type: none"> <li>1. Potential problems with validity and reliability</li> <li>2. The respondent must have the cognitive ability to self-report activity for a segmented day or across days</li> </ol>

Consequently, a combination of methods is usually recommended rather than a single method. Welk and colleagues (2000) suggest that employing a combination of measures may help to provide a more accurate and detailed description of children’s physical activity. Cale (1998) and Welk and Wood (2000) have identified the methods of monitoring young people’s physical activity that they consider to be feasible for use in schools. These include:

1. Observation: this method does not involve sophisticated techniques; all details of the activity can be recorded.
2. Heart rate monitoring: heart rate monitors can be used effectively within PE lessons (Cale, 1998); heart rate information can be recorded over an extended period of time.

3. Motion sensors: pedometers are affordable for schools and can be used in the same way as heart rate monitors (Cale, 1998).
4. Self-report: this is a practical and useful method to use within schools (Dishman, 2006; Welk & Wood, 2000); questionnaires can meet particular needs; young people can relatively easily record information on the physical activity they participate in.

### **2.3.2 Summary**

Daily physical activity, particularly among young people, is a complex blend of events, structured and unstructured, planned and incidental, solitary and social, which occur for competition, leisure, work, educational, or transportation purposes, at school or at home. It can be determined by measuring the physiological responses directly (e.g. motion sensor monitoring, physiological analysis) and by recording the physical movements (e.g. self-and/or proxy-report, observation), each of which has advantages and disadvantages. For example, the self-and/or proxy-reporting methods are relatively easy, low cost, convenient and unobtrusive and they can cover details of physical activities over a variable time frame. Its disadvantages are its imprecision due to pupils' low cognitive ability and the difficulty of estimating the amount of calories spent.

Some other methods can be employed to monitor pupils' physical activity within the school setting, and these methods can be carried out by pupils themselves to help them develop an awareness of their physical activity. These include observation, heart rate monitoring, motion sensors and self-report.

## **2.4 Batteries of Tests Employed to Monitor Young People's Fitness Levels from the mid -1980s to the Present Day**

Physical fitness is a complex phenomenon that has been defined as a capacity or a set

of attributes that individuals have or achieve that enables them to participate in and benefit from physical activities (Caspersen et al., 1985). Fitness has physical and mental dimensions (Harris, 2000). Total fitness is striving for the highest level of existence, including mental, psychological, social, spiritual, and physical components. The most common methods of monitoring fitness are fitness tests, a number of which can be employed with young people (see Tables 2.4 and 2.5).

### 2.4.1 Monitoring Physical Fitness in the Laboratory

The physical fitness of children can be measured in the laboratory via a number of different methods (see Table 2.4). Laboratory-based fitness tests are generally considered to be more accurate, reliable and valid than field tests. However, they have major limitations in terms of practicality and cost. Thus, these methods are not explored in detail here as they are not appropriate for the school setting.

Table 2.4 A Summary of Common Laboratory-Based Fitness Tests Used with Children (Cale & Harris, 2005b, p.44-47)

Component	Common Laboratory-Based Measures
Aerobic fitness	VO <sub>2</sub> max
Muscular strength/endurance	<p><b>Muscular strength</b>            Isometric dynamometer            Cable tensiometer            Isokinetic dynamometer            Isotonic one-repetition maximum (1 RM)</p> <p><b>Muscular endurance</b>            Repetitions or time to fatigue performing at a set percentage of maximum force</p>
Flexibility	Goniometer, Leighton flexometer, Inclinometer
Body composition	Hydrostatic weighing (or densitometry) BIA (Biological Impedance Analysis)

### 2.4.2 Monitoring Physical Fitness in the Field

Methods of monitoring fitness in the field are considered in more depth as they are

generally more appropriate than laboratory-based methods for use in schools. Meanwhile, field fitness tests can only provide crude measures of children's fitness and their validity, reliability, practicality and utility still need to be improved.

### 1. Aerobic fitness/capacity

Distance or timed runs/walks (e.g. 1 or 1.5 mile run, 9- or 12-minute run) are commonly used field tests to measure children's aerobic fitness/capacity (Pate, 1991). The Multistage Fitness Test, also known as the 'bleep test' or the 'shuttle run test', is another commonly employed method of fitness testing which is used for the prediction of maximum oxygen uptake (Eve & Williams, 2000). The test involves subjects running continuously between two points, 20 meters apart, and synchronising the speed to a progressively increasing pre-recorded rhythm until they reach exhaustion.

A variety of step tests have also been developed to categorise cardiovascular fitness on the basis of a person's recovery heart rate following a standardised test. The 3-Minute YMCA Step test is one such example. It uses a 12-inch (30.5 cm) bench, with a stepping rate of 24 steps/min. After exercise is completed, the subject immediately sits down, and heart rate is counted. Heart rate values are used to obtain a qualitative rating of fitness from normative tables (ACSM, 2006).

### 2. Muscular strength and muscular endurance

Sit-ups, pull-ups and flexed arm-hangs are common exercises used for qualifying the fitness level of the abdominal and upper arm muscle groups of individuals respectively (ACSM, 2006). Recently, a 'progressive abdominal sit-up test' has been developed, similar to the running bleep test, where the test subject performs curl-ups synchronizing to a pre-recorded rhythm, until exhaustion (Brewer & Davis, 1992; 2000).

### 3. Flexibility

The 'sit and reach' test is the most commonly employed field test to measure flexibility (ACSM, 2006). Other methods include the shoulder stretch (The Cooper Institute, 2007) or the arm lift (Corbin & Lindsey, 2002).

### 4. Body composition

Body mass index (BMI) is typically used as an estimate of body composition (ACSM, 2006). BMI is a statistical measurement which compares a person's weight and height. Body mass index is defined as the individual's body weight divided by the square of his height. The formulas universally used in medicine produce a unit of measure of  $\text{kg/m}^2$ . Different studies have found high correlations between BMI and adiposity in children (Cole et al., 2000; Dietz & Robinson, 1998). Skinfold measures are another common technique to provide an indicator of subcutaneous fatness (Armstrong & Welsman, 1997a) whereby standard skinfolds measurements are taken at specific sites of the body (usually the triceps, biceps, subscapular, suprailiac, front thigh and medial calf). The sum of the skinfolds can be used as an indication of body fat or can be entered into a regression equation to estimate body density and/or body fat percentage (Claessens et al., 2000). Cale and Harris (2005, p.50) have provided a succinct summary of the common field tests employed with children (see Table 2.5).

Table 2.5 A Summary of Common Physical Fitness Field Tests for Children. (Cale & Harris, 2005b, p.50).

Component	Common Field Tests
Aerobic fitness/capacity	Distance/timed walks/runs (1, 1.5 miles; 9-, 12-minute) Step tests Multistage Fitness Test ('bleep test')
Muscular strength/endurance	Sit ups/curl ups Progressive abdominal sit-up (curl) test Pull-ups Modified pull-ups Push ups
Flexibility	Sit and reach; Shoulder strength; Arm lift
Body composition	Body mass index (BMI) Skinfold thicknesses; Girth measures
Agility*	Shuttle run; Dodging runs
Anaerobic power*	Standing broad jump Vertical jump Sprints

\*Note: agility and anaerobic power are not health-related components of fitness but are commonly employed in field test batteries

### 2.4.3 Fitness Test Batteries

Numerous fitness test batteries have been developed for different purposes over the years. There are usually between 4 to 10 items in a test battery, some of which are skill-related and some health-related. Table 2.6 provides a summary of a number of the common fitness tests batteries and their test items.



Table 2.6 Fitness Test Batteries' Test Items

Fitness Test Battery	Test Items	
AAHPER Youth Fitness Test (American Alliance for Health Physical Education and Recreation (AAHPER), 1976)	Pull-ups (boys) Sit-ups 50-yd dash	Flexed arm hang (girls) Standing broad jump Shuttle run
The Fit Youth Today (FYT) Program (American Health and Fitness Foundation., 1986)	Steady state jog Bent-knee curl-up	Sit-and-reach Skinfolds (triceps and calf)
AAHPERD Physical Best Programme (American Alliance for Health Physical Education Recreation and Dance (AAHPERD), 1988)	One-mile walk/run (or any test 6 minutes or longer) Skinfolds (triceps and calf or triceps and subscapular)	Body mass index (BMI) Sit-and-reach test Modified sit-ups Pull-ups
EUROFIT (Council of Europe, 1988)	Endurance shuttle run Bicycle ergometer test (PWC <sub>170</sub> ) Handgrip Standing broad jump Bent arm hang Sit-ups	Shuttle run 10 x 5 meter Plate tapping Sit and reach Flamingo balance Skinfolds (biceps, triceps, subscapular, suprailiac, calf)
The Chrysler Fund-AAU Physical Fitness Program (Chrysler Fund-Amateur Athletic Union, 1991)	Endurance run Bent-knee sit-ups Sit and reach (V-sit reach) Pull-ups (boys) Flexed arm hang (girls)	Push-up, modified (girls) Isometric leg squat Shuttle run Sprints Isometric push-up
The President's Challenge (President's Council on Physical Fitness and Sports, 1987)	One-mile run/walk Pull-ups V-sit and reach or sit and reach	Curl-ups (1 min) Shuttle run
The FITNESSGRAM/ACTIVITYGRAM Program (The Cooper Institute, 2007)	1-mile walk-run Sit-ups Pull-up/flexed arm hang Sit and reach	Skinfolds test or body mass index Shuttle run test (grades K-3)

The FITNESSGRAM/ACTIVITYGRAM is a relatively recent test battery (The Cooper Institute, 2007) and is introduced in detail in this section because it is particularly relevant and applicable to the education context. FITNESSGRAM/ACTIVITYGRAM is the educational assessment, data management, and reporting software program developed by the Cooper Institute. The software contains two major components, a comprehensive physical fitness assessment and reporting

program (FITNESSGRAM), and a detailed 3 day physical activity assessment program (ACTIVITYGRAM). Students are assessed in the following areas of health-related fitness: cardiovascular fitness, muscle strength, muscular endurance, flexibility, and body composition. Scores are evaluated against objective criterion-based standards, called Healthy Fitness Zones, which indicate the level of fitness necessary for health. FITNESSGRAM/ACTIVITYGRAM software generates student and parent reports that contain objective, personalized feedback and positive reinforcement. These reports serve as a communications link between teachers and parents. Table 2.7 outlines the various tests available in the battery and denotes the recommended assessment in each category.

Table 2.7 *FITNESSGRAM* Test Items. (The Cooper Institute, 2007, p. 26)

		Muscular Strength, Endurance and Flexibility			
Aerobic Capacity	Body Composition	Abdominal Strength & Endurance	Trunk Extensor Strength & Flexibility	Upper Body Strength & Endurance	Flexibility
The PACER*	Skinfold Measurements*	Curl-Up*	Trunk Lift*	90 degree Push-Up*	Back Saver Sit & Reach
Mile Run	Body Mass Index			Modified Pull Up	Shoulder Stretch
Walk Test**				Pull-Up	
				Flexed Arm Hang	

\* Recommended Test

\*\* Walk test is only available for secondary students.

#### 2.4.4 Comparison of Fitness Test Batteries

A review of the seven major fitness test batteries outlined above suggests that they are much more alike than different with regard to the fitness aspects they measure. For example, all of the batteries include tests of cardiorespiratory endurance (e.g one mile walk/run or longer) and abdominal muscular strength and endurance (e.g curl ups/sit

ups). Flexibility (e.g sit and reach) is included in seven of the eight batteries, and upper body muscular strength and endurance (e.g pull ups for boys and flexed arm hang for girls) is measured in six of the test batteries. Five test batteries assess body composition by measuring the triceps and calf skinfolds; the EUROFIT measures the most skinfold sites (biceps, subscapular and suprailiac). The Body Mass Index (BMI) is offered as an option to the skinfold measurement in two test batteries. Speed/agility is measured in five of the test batteries by means of a short distance shuttle run and in two by means of a short distance sprint. Anaerobic power is measured in two of the test batteries. Only one test battery measures balance.

A key difference between the test batteries is that some emphasise evaluation of health-related fitness and others skill-related fitness (Pate, 1994; Safrit, 1990). Not all the monitoring items or batteries outlined above, especially those that focus on skill-related fitness testing, are considered appropriate for all pupils within the school setting for various reasons, and numerous issues and concerns have been raised over the use of fitness tests with children (Cale, 1998; Cale & Harris, 2005a; Harris, 2000; Rowland, 1995). These are outlined and critiqued in the next section.

#### **2.4.5 A Critique of Fitness Tests**

A number of issues and concerns have been raised over the use of fitness tests with children (Cale, 1998; Cale & Harris, 2005a, 2009b; Cale et al., 2007; Harris, 2000; Rowland, 1995). For example, the validity, reliability and appropriateness of some fitness tests have been questioned. In terms of validity, Pangrazi (2000) claimed that the validity of fitness tests could not automatically be generalized across different age groups. Other factors such as the environment (e.g. temperature, humidity, wind speed), lifestyle (e.g. exercise, nutrition), test protocol/procedures; motivation, skill, maturity and heredity or genetic potential can all influence pupils' performance on

fitness tests. Gifted students will out-perform other students even without an active or healthy lifestyle (Bouchard et al., 1994; Fox & Biddle, 1986). Also, the reliability of some fitness test results has seldom been examined (Cale & Harris, 2005a; Cale et al., 2007). Armstrong and Biddle (1992) also claim that fitness tests only distinguish the mature and/or motivated from the immature and/or unmotivated. Rice (2000) considers that some children may not take tests seriously and may not give maximal effort, so the test results do not reflect their true ability.

The appropriateness of some fitness tests for children (e.g. the Multistage Fitness Test) is questionable as they were developed for use with elite, adult populations (Cale & Harris, 2005b, 2009b). Pupils' physiological responses to tests are different from adults' responses, therefore a modified version of fitness tests may be more appropriate for use with children (Bar-Or, 1993).

In Pate's view (1991), the reason for administering fitness tests is to facilitate learning in the cognitive and affective domains in terms of promoting knowledge and understanding of, and positive attitudes towards, exercise and fitness. In this respect, some physical fitness batteries are now packaged attractively with test manuals, curricular guidelines and instructional materials to assist the user/teacher (Pate, 1994; Safrit, 1990) and some also have computerized feedback systems (e.g. FITNESSGRAM/ACTIVITYGRAM). Several of the test batteries have also developed criterion-referenced standards to interpret the test results (Cureton & Warren, 1990). Generally, *criterion-referenced standards* tend to normalize at an easily attainable level for most young people. This allows educational opportunities to reinforce the fact that one can be fit without being an elite athlete (ACSM, 1988, Pate, 1994). Criterion standards also specify the minimum levels of fitness used to categorize pupils into groups and inform them of their fitness categories (Harris & Cale, 2006). This methodology, however, could lead to misclassifications of

individuals and may have negative consequences (Cale & Harris, 2009b). For example, the standards may not provide enough incentive for young people to achieve higher fitness levels (Cale & Harris, 2009b).

One way of motivating pupils to participate in fitness activities is through rewards. However, external awards or reward systems for physical fitness tests can undermine the long-term intrinsic motivation of pupils (Cale & Harris, 2005b). The use of external awards to 'bribe' or 'lure' young people to participate is likely to be counter-productive in encouraging lifetime participation (ACSM, 1988; PEA UK, 1988).

Fitness test results have been reported to have been used in the following ways: to grade pupils, as a primary indicator of achievement in PE; to evaluate teacher competence; or as a measure of the success of an institution or programme (Cale & Harris, 2009b; Corbin & Lindsey, 2002; Corbin et al., 1995). However, Corbin (2002, p.134-5) warns that such uses could potentially have the following negative consequences: loss of interest in PE or physical activity; teaching to the test; cheating on fitness tests; and undermining the confidence of those students who do not meet teacher expectations.

Harris and Cale (2006, p.211) have summarized some of the general advantages and disadvantages of field-based fitness tests and test batteries. The advantages include:

- (1) Tests are generally easy to administer and time efficient.
- (2) Tests are relatively safe and involve minimal equipment and low cost.
- (3) Considerable thought has been given to the scientific evidence supporting tests and there have been advances in the development and use of physical fitness tests for children.
- (4) Emphasis is currently on the evaluation of health-related fitness components and

has shifted in recent years from testing in isolation to an educational programme with testing as an integral part.

- (5) Many physical fitness programmes are packaged attractively and include a test manual, curricular guidelines and instructional materials to assist the users/teachers.
- (6) Some programmes have computerized feedback systems.

The disadvantages include:

- (1) The appropriateness of some fitness tests for use with children is questionable (e.g. the Multistage Fitness Test was developed for use with elite, adult populations).
- (2) Children's metabolic, cardiopulmonary, thermoregulatory, and perceptual responses to exercise are different from those of adults and a different approach may therefore be required in administering tests to children.
- (3) Field tests provide only a crude measure of an individual's physical fitness and are not considered suitable for the assessment of single, basic, physiological functions.
- (4) The reliability and validity of some fitness tests for use with children are questionable and the need for additional evidence of the reliability and validity of tests and test batteries has been identified.
- (5) Concerns about reliability and validity are associated with teachers' relatively limited direct experience of test administration and a requirement for administrative rigour.
- (6) Concerns about reliability and validity also stem from the fact that many factors influence children's performance on fitness tests and will be reflected in fitness test scores, namely: the environment/test conditions (temperature, humidity, wind speed/direction); lifestyle (exercise/nutrition); test protocol/procedures;

motivation; intellectual and mechanical skill at taking the test; heredity or genetic potential; maturation.

More recently, Cale and Harris (2009, p. 103) have summarized the following potential drawbacks of fitness testing: it is a misguided, backward looking step; it is fraught with validity, and reliability difficulties; it has not been effective in the past; and it serves no real purpose in terms of increasing participation or promoting interest in sport. If fitness testing is to provide meaningful data, the assessment techniques need to be valid, reliable and practical. However, as outlined above, a number of issues and limitations have yet to be addressed. As Safrit (1990, p.25) declared, it seems 'much still needs to be done' to improve the validity, reliability, practicality and thereby utility of fitness testing with pupils. Cale and Harris (2009, p.97) proposed that fitness testing should only be adopted if it was meaningful, relevant and had 'a direct and positive influence on motivating teachers/pupils to develop active lifestyles'.

#### **2.4.5.1 Shift in Emphasis**

Over a decade ago, there was a debate regarding the necessity of fitness testing for children (Corbin et al., 1995; Rowland, 1995) - the argument was focused on whether the 'horse' of fitness testing in schools was dead and it was suggested that perhaps the 'horse' of fitness testing should be 'dismounted' in schools.

Practical and methodological issues and concerns aside, there is also concern that fitness tests could lead to the prominence of product-related issues such as 'fitness' and 'performance' over process-oriented issues such as 'health' and 'physical activity' behaviour (Cale & Harris, 2002; Harris & Cale, 1997). In a review of children's fitness test batteries, Cale and Harris (2006, p. 205) indicated that there has

been a 'gradual shift in emphasis over the years from a focus on physical fitness to physical activity, and other lifestyle behaviours'. For example, the Canada Fitness Survey was re-named the '2002 Survey of Well Being in Canada' and shifted to investigate current physical activity involvement rather than physical fitness (Harris & Cale, 2006). In a similar vein, the US National Youth Risk Behaviour Survey (YRBS) replaced the National Children's Fitness Survey II and was developed to monitor health risk behaviours such as inadequate physical activity and tobacco, alcohol and drug use that might cause death, disability and social problems among young people and adults in the US (see for example, Department of Health and Human Services and Centers for Disease Control and Prevention, 1996).

It has also been suggested that fitness and fitness testing is limited in that it represents an individualistic approach to physical activity promotion which fails to acknowledge factors in the physical and social environment which influence physical activity. In Cale and Harris's (2006) view, increased knowledge about the benefits of physical activity, and growing awareness of the volume of physical activity required to bring about health benefits, are possible reasons for the shift in emphasis away from fitness to physical activity. More recently, researchers (Cale & Harris, 2005a, 2009b; Cavill et al., 2001; Corbin, 2002; Pangrazi, 2000) have advocated various reasons for promoting physical activity rather than physical fitness. For example, Cale & Harris (2006, p.215) identified the following reasons: (1) many young people are inactive and a sizeable proportion do not meet current physical activity recommendations; (2) genetic influences and maturational status contribute to fitness testing results; (3) routine field fitness testing is 'archaic and inconsistent with our understanding of the exercise-health connection' (Rowland, 1995, p.120); (4) putting too much focus on fitness may be counterproductive and have many negative consequences; (5) a focus on increasing fitness levels was common practice in some



countries for many years, but was unsuccessful in promoting activity; (6) increasing physical activity can be accomplished by all children regardless of ability, personal interests, genetic and maturational levels; (7) promoting physical activity is more acceptable to the general public, and in particular to those who are sedentary or have low fitness levels. They further suggested that much of the fitness testing conducted within PE may well represent a misdirected effort in the promotion of healthy lifestyle and physical activity, and that PE time could be better spent.

However, the 'horse' is still not dead and the debate continues (Cale et al., 2007; Silverman et al., 2008). Schools are still involved in fitness testing activities. More recently, Liu (2008) published a commentary titled 'Youth fitness testing: if the 'horse' is not dead, what should we do?' about fitness testing in schools and its necessity, and tried to create more discussion about how we can appropriately conduct fitness tests. Furthermore, Silverman and colleagues (2008) argued that it is time to dismount the horse of fitness testing only when fitness testing is used in isolation without an educational purpose. Likewise, Rowland (1995) suggests that a shift of promoting physical activity is more likely to be acceptable to the general public, particularly to those who are sedentary or have low fitness levels. He further claims that a shift from a fitness to a physical activity promotion model would serve as the best argument for abandoning the practice.

#### **2.4.6 Summary**

Historically, physical fitness assessments have been commonplace within the physical education curriculum. If used appropriately, fitness assessments can enhance instruction of fitness concepts, provide a diagnosis of fitness needs for individual exercise prescription, facilitate fitness goal setting and self-monitoring skills, and promote fitness knowledge and self-testing skills (Whitehead et al., 1990). However,

as pointed out in this section of the literature review, there are many factors other than physical activity that can influence a child's performance on physical fitness tests. An overemphasis on fitness testing in the curriculum can send the wrong message to children about physical activity. These concerns have caused many experts to question the continued emphasis on physical fitness testing in the curriculum (Naughton et al., 2006). More recent developments in monitoring have seen a shift away from a focus on fitness to a focus on lifestyle behaviours with surveys often providing information on young people's physical activity levels and other lifestyle behaviours. While fitness is still a desirable outcome, more emphasis is being placed on promoting the behaviour of physical activity. Incorporating physical activity assessments into the curriculum can permit better instruction on physical activity concepts and can avoid some of the problems associated with fitness testing.

## **2.5 Methods Used to Monitor Young People's Health, Physical Activity and Fitness within the School Curriculum**

### **2.5.1 Introduction**

Since young people spend 40-45 percent of their waking time in school (Fox et al., 2004; Stratton et al., 2008), schools are an important setting for promoting healthy, active lifestyles (Centers for Diseases Control, 1997; Department of Health, 2004a). In this section, monitoring young people's health, physical activity and fitness within the school curriculum will be reviewed.

### **2.5.2 Monitoring Health in the School Curriculum**

Schools have the potential to improve the health of young people by planning and delivering health education programmes to influence their behaviour, values and

attitudes towards health while they are still young (Connell et al., 1985; Harris, 2000; Morbidity and Mortality Weekly Report, MMWR, 1997). PE programmes can teach pupils how to improve current and future health and well-being. Moreover, the whole school environment can also improve the attitudes, self-esteem and self-confidence of children (Harris, 2000). McKenzie (2001) views PE as the most suitable vehicle for the promotion of healthy lifestyles among young people. Green (2002, p.95) agrees, believing that school PE should be the 'default' or the 'taken-for-granted' agency for health promotion.

### **2.5.3 Monitoring Physical Activity in the School Curriculum**

Schools have the potential to promote safe, enjoyable and lifelong physical activity, and help pupils develop knowledge, understanding, physical competence, behavioural skills, and positive attitudes towards physical activity (Department of Health, 2004b). Schools are well positioned to do this because they (1) reach most pupils; (2) have trained personnel with an interest in promoting health; (3) have an organisational structure and facilities that can be used to promote physical activity; and (4) have a capacity to interact with community-based physical activity providers and other community groups (Pate et al., 2000; Stratton et al., 2008).

Welk & Wood (2000) note, that if the intention of school PE is to instill physically active lifestyles for students, some emphasis should be placed in the PE curriculum on monitoring physical activity. Cale (1998) proposes the following reasons for monitoring and analysing pupils' physical activity within the curriculum: firstly, to establish how active pupils are and to determine if they are meeting current physical activity guidelines; secondly, to help meet the requirements of the National Curriculum for Physical Education (NCPE); and thirdly, to promote active, healthy lifestyles (Cale & Harris, 2002; Corbin, 2002; Harris & Cale, 1997; Pangrazi, 2000).

Current guidelines (HEA, 1998; National Association for Sport and Physical Education, NASPE, 2004b) call for youth to accumulate 60 minutes of physical activity a day in a variety of age-appropriate activities. The guidelines specify a minimum of 60 minutes because children have a greater need for activity than adults, they have more available time than adults, and enhanced opportunities to learn motor skills (HEA, 1998).

Instruments used to monitor physical activity within an educational context do not need to be as accurate as in the laboratory (Cale & Harris, 2005). Cost, ease of use, and educational value should be weighted more heavily than accuracy when choosing the measuring instruments (Welk & Wood, 2000). Welk and Wood (2000) suggest that rather than being concerned about the precision of the evaluation, it is more important to focus on what young people learn through the process, as the emphasis is justifiably on learning about and through physical activity, not exclusively on physical activity participation itself.

#### **2.5.4 Monitoring Fitness in the School Curriculum**

Fitness testing is commonplace in the PE curriculum (ACSM, 2000; Harris, 1995) with the majority of secondary schools in England including fitness testing as part of their PE curriculum (Cale, 2000; Harris, 1997b; Ross & Gilbert, 1985). Furthermore, in most schools fitness testing is compulsory for the 11-14 age group and is often optional for the 14-16 age group (Harris & Elbourn, 1994). Pate (1994) and Whitehead et al (1990, cited in Harris and Cale, 2006) summarized the range of possible purposes of fitness testing within the school setting as follows: (1) programme evaluation; (2) motivation of pupils to participate in physical activity; (3) identification of children in need of improvement; (4) screening for high potential children; (5) diagnosis of fitness needs and prescription of individual fitness improvement exercise programmes; (6) promoting physical activity, setting individual

fitness goals, training self-monitoring and self-testing skills, and (7) cognitive and affective learning.

Piotrowski (2000) identified some typical reasons for the prevalence of fitness testing in school/the curriculum: (1) teachers recognise that optimum fitness levels encourage young people to engage in regular physical activity; (2) fitness tests provide insights into pupils' fitness performance and track their progress over time; (3) fitness test results may motivate pupils to increase their activity and fitness levels; (4) fitness testing provides objective measurements, and seemingly objective data on children's capabilities in many aspects of physical fitness; (5) fitness test results can be used to grade pupils, as a primary indicator of achievement in PE. Fitness testing may motivate young people to participate in the activity necessary to produce the desired fitness outcomes. Furthermore, fitness tests appear to address public health concerns about young people's activity, health and fitness levels and, if appropriately employed, may trigger fundamental behavioural and attitudinal changes with respect to regular physical activity (Cale & Harris, 2005a, 2009b).

As mentioned earlier, although fitness testing is controversial (Corbin & Pangrazi, 1992; Freedson & Rowland, 1992; Shephard & Lavalley, 1994), there are a number of other possible reasons for its common usage in schools in England (Cale & Harris, 2005a). Firstly, concerns over young people's physical fitness have attracted a good deal of attention in recent years. Secondly, an interest in fitness and performance is reinforced by the requirements of the NCPE. Thirdly, fitness testing is a relatively easy and accessible way of categorising and identifying low level performers (Office for Standards in Education (OFSTED), 1996), and finally, fitness tests are simply a 'passed down' tradition of conventional and health-related PE programmes (Harris & Cale, 1997).

To date, however, and despite its popularity, there are no nationally recognized

tests or monitoring procedures in secondary schools in the UK designed to address the National Curriculum and issues and concerns relating to monitoring health, physical activity and fitness in the school curriculum.

Harris (1997) found that the most commonly employed fitness tests in schools were the time/distance run, the Multistage Fitness Test (or 'bleep' test), step test, 'sit and reach' flexibility test, curl-ups and press-ups. Not all of these fitness test items or programmes, however, are considered to be suitable for pupils (Cale & Harris, 2009b). For instance, the risks associated with using the Multistage Fitness Test with young people have been identified and safety advice has been given on how to reduce risks with the test (Eve & Williams, 2000). Harris and Elbourn (1994, p.11) suggest that physical educators should be able to evaluate fitness tests based on whether they are: (1) valid in measuring what they intend to measure; (2) reliable; (3) accessible to all pupils; (4) relevant to health; (5) fair for participants; (6) educational; (7) enjoyable and motivating for most pupils; (8) reflective of physical activity levels; (9) effective in increasing physical activity levels, and (10) consistent with good practice.

The relevance and appropriateness of the mile run and other tests for children have also been questioned (Hopple & Graham, 1995). Most tests have been developed for use with adults or elite populations and are often applied to young people with little consideration of the difference between children's and adults' physiological and psychological responses to exercise (Armstrong, 1989; Bar-Or, 1993). Furthermore, some tests can be threatening and uncomfortable for some children who are not familiar with exercising or physical activity (Cale & Harris, 2009b; Corbin et al., 1995; Harris & Elbourn, 1994; Rowland, 1995). They can be demeaning, embarrassing, and uncomfortable for those children who are least active or healthy (ACSM, 1988; Rowland, 1995), and can have a negative impact/influence on children's intrinsic motivation to be active and fit (Hopple, 1992). Some children

view fitness tests as a painful, negative experience and may try to dodge them (Harris, 2000; Hopple & Graham, 1995). The PEA UK (1988) also noted that there is no hard evidence that fitness tests motivate individuals except those who do well. Testing can also enhance the view that exercise is competitive and unpleasant (Cale & Harris, 2009b; Hopple & Graham, 1995). Some fitness tests also lead to the erroneous belief that competition and excellence are necessary conditions for health and fitness, which may confuse the goal of promoting physical activity and turn many young people 'off' physical activity rather than 'on' (Corbin et al., 1995). Thus, fitness testing procedures might negatively affect young people's social, emotional and attitudinal values towards physical activity (Harris & Cale, 1997; Cale & Harris, 2009).

Furthermore, fitness tests purport to assess health-related components of physical fitness yet do not provide any clinical measures of health status (e.g. blood pressure, blood lipids) (Harris & Cale, 2006). Also, whilst some tests propose in theory to emphasise safe healthy practices, in reality they involve children performing exercises that violate healthy behaviour (e.g. exercising to exhaustion in the Multi-Stage Fitness Test and curl ups) (Seefeldt & Vogel, 1989). Whether fitness testing is conducive to achieving health goals in school PE is also a crucial question. The concern in terms of health is the adoption of a physically active lifestyle rather than concentrating on achieving the highest level of fitness (HEA, 1998b).

In addition, it is often assumed that fitness test results reflect the amount of physical activity undertaken and that those who score highly on fitness tests are more active than those who do not (Pangrazi, 2000). As noted earlier, the relationship between fitness and physical activity among young people, however, is low (Armstrong & Welsman, 1997c; Rizzo et al., 2006). It is possible that a negative fitness testing experience may reduce young people's desire to be active in the future.

Furthermore, there is little or no evidence that improvements in fitness test

scores lead to improvements in health or in health-related behaviour (e.g. becoming more active) (Harris, 2000; Physical Education Association of the United Kingdom (PEA UK), 1998). Thus, until there is more evidence to support the relationship between childhood fitness test scores and children's general health, more attention should be paid to understanding young people's patterns of, and attitudes towards physical activity (Cale & Harris, 2002), and perhaps to including the assessment of these elements within fitness testing programmes (Pate, 1994). Inadequate physical activity may lead to low fitness and increased risk of illnesses and diseases over time, so understanding pupils' physical activity behaviour is considered to be more important than focusing on fitness during childhood (Blair et al., 1989; Cale & Harris, 2009b; Freedson & Rowland, 1992; Pate et al., 1994; Rowland & Freedson, 1994).

As noted earlier, despite the controversy surrounding fitness testing, the administration of such tests can be an opportunity to promote valuable cognitive and affective learning in the PE curriculum (Pate, 1994). Testing can provide an opportunity to reinforce knowledge and understanding of health and fitness and promote active, healthy lifestyles (Cale & Harris, 2002). If administered appropriately, it can also be motivational. However, the selection, purpose, delivery and impact of fitness testing should be considered carefully to ensure that it assists in promoting long term involvement in physical activity rather than just short-term fitness gains (Cale & Harris, 2002). Also, fitness tests should not be a major part of or dominate the PE curriculum (Cale & Harris, 2002, 2009b; Pate, 1994). The goal of PE should be to promote a physically active lifestyle, to promote maintenance of good health and fitness throughout life. Fitness tests should be utilised to attain this goal (Pate, 1994). Teachers should monitor health and fitness in a variety of ways, and not rely purely on the administration of tests. For example, the assessment of 'knowledge and understanding', 'competence and motor skills', 'behavioural skills', and 'attitudes and



confidence' should all be incorporated into the PE curriculum (Harris, 2000).

Indeed, the inadequate amount of curriculum time spent on influencing pupils' activity levels or attitudes towards physical activity has been criticized (Cale & Harris, 2002, 2009b; Harris & Cale, 1997) and it is felt that curriculum time spent on testing may detract from the time available for promoting physical activity (Cale & Harris, 2009b; Harris, 2000), and developing knowledge and understanding about physical activity and fitness. Fitness testing which is administered simply to acquire test data without paying attention to its educational purpose and role of testing, is not advised (Harris, 2000).

Furthermore, if fitness tests are used primarily to promote activity and cognitive and affective learning about health and fitness knowledge, then the standardization of testing procedures and the validity of test results are of less importance. One means of achieving this learning might be through self-testing among young people. Self-testing has many benefits including young people assuming responsibility for their own learning; it being time efficient; the testing performance remaining 'confidential,' and finally, the testing process being student-centred rather than teacher-centred (Corbin et al., 1995; Pate, 1994; Ratliffe & Ratliffe, 1991).

The Fitness and Health Advisory Committee of the PEA UK (1988) stated that fitness testing can play a valuable role in the promotion of physical activity and in educating young people about fitness and physical activity if it is used to:

- a. encourage positive attitudes towards health-related fitness;
- b. increase understanding of the principles underlying health-related fitness; and
- c. promote a lifetime commitment to health-related fitness.

PE teachers are encouraged to reflect on and adapt their teaching philosophy and practices, employ appropriate monitoring instruments, and identify and overcome the limitations associated with monitoring within the curriculum in order to effectively

promote healthy, active lifestyles amongst young people (Armstrong & McManus, 1994; Cale & Harris, 1998, 2009b; Harris, 2000; MMWR, 1997).

To achieve these desired outcomes, however, Cale and Harris (2005) suggest that clear guidance on the use of fitness testing with young people is needed. They have also summarised key recommendations for fitness testing from a number of sources (Cale and Harris, 2005, p.221-3) and these are presented in Table 2.8.

Table 2.8 Fitness Testing Recommendations (Cale & Harris, 2005, p.221-3)

**General**

Fitness testing should not dominate a PE programme, neither should it be an adjunct to it. It should be fully and appropriately integrated into the curriculum.

Fitness testing should be used to encourage and help young people acquire and maintain fitness levels that are appropriate for their personal needs. It should be recognized that the majority of youngsters are sufficiently 'fit' and that 'high level' fitness is not necessary for all young people.

**Content**

Fitness testing should focus on monitoring the health-related components of fitness (i.e. cardiovascular fitness, flexibility, muscular strength and endurance, and possibly body composition (if dealt with sensitively)).

Test batteries should be developmentally appropriate and include developmentally appropriate exercises (e.g. different versions of exercises). Tests designed for adults should be avoided, or modified and sub-maximal tests selected.

It should not be assumed that fitness testing will increase pupils' activity levels. The development and maintenance of lifelong activity habits should be addressed and activity promotion measures included (e.g. monitoring activity; raising awareness and providing access to activity opportunities; goal setting, self monitoring and self-evaluation) alongside testing.

**Organisation/Delivery**

Testing should be child-centred and accessible for all young people. Personal improvement over time should be the focus, not comparisons with others.

Fitness testing should be a positive and meaningful experience presented in an individualized manner with baseline scores and feedback from which to improve their activity and fitness levels. Testing should never be administered at the expense of an individual's self-concept or confidence. The public nature of testing should be

minimized and prior practice given on tests to make young people feel comfortable and at ease and to allow them to perform their best. If body composition is measured, this should be done so sensitively and as privately as possible. Compulsory use of exhausting maximal tests should be avoided. It may be appropriate to incorporate fitness testing as a choice activity.

Fitness testing should promote learning, and health-related learning concepts should be delivered during the fitness testing process (e.g. explaining the relevance of each component and ensuring that young people understand how to improve each component).

Fitness testing should adhere to and be consistent with good practice (e.g. it should incorporate a warm-up and cool-down, safe exercise practices, familiarization with the testing procedures, and be conducted in a safe environment-well ventilated, adequate space, with appropriate equipment).

Fitness testing should be made as much fun, and as varied and relevant as possible, and move beyond 'traditional' administration methods. For example, student choices, testing options, home tasks, self and partner/peer (vs. whole-group) assessments. Encouragement of self-responsibility and goal setting, and the use of fun equipment may hold merit and be more developmentally appropriate and relevant ways of testing young people's fitness.

### **Feedback/Evaluation**

Fitness test results should be communicated and used with young people in a meaningful way that promotes affective and cognitive learning about maintaining and/or improving personal fitness. Fitness test scores should be interpreted and explained carefully, with recognition of their limitations.

If standards are used in interpreting scores, they should be explained, and criterion-referenced rather than normative standards should be employed (criterion-referenced standards are attainable by the vast majority of young people and reinforce the fitness-health link and the notion that one can be fit without being an elite athlete).

Whilst all young people should be provided with feedback, it is particularly important that youngsters identified as very low fit are provided with appropriate and sensitive remedial support, encouragement and progress monitoring. This might involve suggestions for activities/exercises they can undertake in their leisure time at home or in the local community, communication with parents or, in extreme circumstances, referral to their GP.

Test re-test procedures (e.g. administering a test at the beginning and again at the end of a unit of work, school year) should be implemented with caution and only if the intervening programme/unit was designed to produce change and promote 'fitness'. Even then, programmes/units are often too short (6-8 weeks) to expect any

real changes and testing could have a demotivating effect. The practice can also be time-consuming and detract from learning time.

The use of external rewards or award schemes can be a useful and legitimate tool for motivating young people but should be used sparingly. They should not be used to bribe children or to reward performance. If employed, they should reward and encourage activity objectives (not fitness performance) and should be attainable by all young people.

Home influence on young people's activity and fitness levels should be recognized in feedback/evaluation and parents/guardians should be encouraged to show interest in their children's physical activity and physical fitness and to be positive role models.

### **2.5.5 Summary**

Physical education should inform young people about the health risks of physical inactivity and the benefits of being physically active. It should educate students about their current and future health, activity and fitness status, and develop their knowledge, understanding, and positive attitudes towards physical activity. One way in which this can be achieved is via health, activity and fitness monitoring. Here, the key issues associated with monitoring health, physical activity, and fitness, have been reviewed and the place, purpose and role of fitness testing in the PE curriculum have been questioned.

Whilst the validity, reliability and appropriateness of fitness testing have been questioned, testing is still a commonly employed method of monitoring within the PE curriculum. This is perhaps because it is thought to enhance pupils' knowledge and understanding of health and fitness and to promote active, healthy lifestyles, if it is employed appropriately.

From a pedagogical perspective, what young people learn through the monitoring process is considered to be more important than the precision of the assessment. It is argued that positive developments in 'knowledge and understanding', 'behavioural skills', and 'attitudes and confidence' should be the main objectives of

monitoring health, physical activity and fitness within the school curriculum. If PE is to be successful in this regard, then the content and delivery of the curriculum is critical and it is important that young people are provided with the knowledge, understanding and skills required for lifelong participation in physical activity and with positive, meaningful and relevant physical activity experience that will foster positive attitudes and confidence (Cale & Harris, 2009b, p.90).

## **2.6 Young People's Physical Activity and Fitness levels**

The physical activity levels of young people have been increasingly documented. Some consider that today's children are highly and spontaneously active, have endless energy and are constantly on the move (Astrand, 1994), while others are of the opinion that young people have been habituated into sedentary lifestyles and that their activity levels have declined over the years (Cavill, 2001). What is the reality in terms of young people's physical activity and fitness levels? This section endeavours to clarify what is known about young people's physical activity and fitness levels by drawing on the findings and conclusions from a selection of reviews and studies.

### **2.6.1 Young People's Physical Activity Levels**

A number of reviews and studies have investigated young people's activity levels using a variety of methods and the key findings are briefly summarised in the following section.

#### **2.6.1.1 Reviews**

Cale and Almond (1992) conducted a series of reviews on the activity levels of children and they noted that young people were not very active and their activity levels were low, with many children not taking sufficient exercise to enhance their

health status.

A review by Armstrong and Van Mechelen (1998) noted boys to be more active than girls from an early age and both sexes to reduce their physical activity from childhood through adolescence, with the rate of decline greater in girls. They concluded that some pupils and adolescents lead sedentary lifestyles but others appear to be active.

Boreham and Riddoch (2001) reviewed physical activity studies and claimed 'it is clear that we are currently undecided about (a) how much activity children take; (b) whether children's activity is falling; and (c) whether children's activity is sufficient to promote health' (p.921).

A further review of young people's physical activity surveys conducted with the European Union member states (Cavill, 2001) reported that many young people are very active and enjoy a great deal of sport and recreation (Lopes et al., 2007), but that in some countries, especially with boys, polarization of activity is evident, with groups of very active and very inactive adolescents.

### **2.6.1.2 Large-Scale Studies**

Large-scale international and national studies of young people's physical activity levels are summarised in Tables 2.9 and 2.10 respectively.

Researchers (project)	Areas	Results
Youth Media Campaign Longitudinal Survey (Center for Disease Control and Prevention (CDC), 2003)	USA	<ol style="list-style-type: none"> <li>62% of children aged 9 to 13 did not participate in any organized physical activity during their non-school hours.</li> <li>23% of children did not engage in any free-time physical activity.</li> <li>There was no difference between males and females.</li> </ol>
Youth Risk Behavior Surveillance (Center for Diseases Control and Prevention, 2003)	USA	<ol style="list-style-type: none"> <li>38% of children aged 9-13 participated in organised physical activity.</li> <li>33% of adolescents (grades 9-12) participated in insufficient levels of moderate and vigorous physical activity</li> </ol>
Youth Risk Behavior Survey (Eaton et al., 2006)	USA	<ol style="list-style-type: none"> <li>36% of US high school students met the 60-minute MVPA guideline.</li> </ol>
EnKid Study (Roman et al., 2008)	Spain	<ol style="list-style-type: none"> <li>48% of individuals from 6 to 18 years did at least 60 minutes of physical activity daily.</li> <li>49% of girls and 37% of boys did not practice any sports during leisure time.</li> <li>Social status and mothers' educational level acted positively on the pupils' physical activity levels.</li> </ol>
King and Coles (1992)	Europe	<ol style="list-style-type: none"> <li>38% of boys and 72 % of girls exercised less than once a week.</li> <li>A consistent decrease in participation was evident with age, especially among girls.</li> </ol>
WHO (2000) (HBSC)	Europe, Canada, USA	<ol style="list-style-type: none"> <li>65% of boys and 47% of girls participated in vigorous exercise two or more times a week.</li> <li>80% of boys and 63% of girls participated in vigorous exercise for two or more hours per week.</li> </ol>

Table 2.10 Summary of Large-Scale Studies of Young People's Physical Activity in England

Researchers (project)	Areas	Results
Health Survey for England (2007)	England	<ol style="list-style-type: none"> <li>75% of boys and 63% of girls achieved the recommended level of physical activity.</li> </ol>

<p>(The NHS Information Centre-Lifestyle Statistics, 2009)</p>		<ol style="list-style-type: none"> <li>2. 13% of boys and 18% of girls participated in physical activity for at least 30 but less than 60 minutes on 7 days in the last week.</li> <li>3. The most common types of activity for both boys and girls were active play and walking.</li> <li>4. The most common sport children aged 11 to 15 participated in outside of school lessons was football (47%), followed by swimming or diving (34%) and cycling or bike riding (21%).</li> </ol>
<p>Taking Part Survey Department for Culture, Media and Sport (2006)</p>	<p>England</p>	<ol style="list-style-type: none"> <li>1. 95% of children engaged in an active sport during the last four weeks.</li> <li>2. 93% of children participated in an active sport out of school lessons.</li> <li>3. A quarter of children participated for at least an hour on one day. A fifth of children had participated for at least an hour on two days</li> <li>4. The most common active sport participated in was football followed by swimming or diving and basketball or cycling or biking riding.</li> </ol>
<p>The Young People and Sport National Survey (2002)</p>	<p>England</p>	<ol style="list-style-type: none"> <li>1. Almost all young people took part in some sporting activity at least once in the previous 12 months.</li> <li>2. A significant minority (13 to 14%) did not take part in any sport regularly in free time.</li> <li>3. The top three sports played outside of schools were swimming, cycling and football.</li> <li>4. Boys' participation was greater than that of girls.</li> </ol>
<p>Young People Health-Related Behaviour Survey, Balding (2001)</p>	<p>England</p>	<ol style="list-style-type: none"> <li>1. 80% of young people reported to have exercised and breathed hard at least once in the previous week.</li> <li>2. 46% of males and 33% of females exercised vigorously three times or more a week.</li> <li>3. The difference between boys' and girls' participation was evident.</li> </ol>

### 2.6.1.3 Are Young People Active?

Despite the evidence presented, a key question which still remains is whether young people are active enough to benefit their health. Armstrong and Van Mechelen (1998) have claimed that whether young people are classified as 'active' or 'inactive'



depends on the criteria used. To determine this physical activity level, information must be collected from studies over a period of time, which have used the same methods with similar groups of children, but such studies are virtually non-existent (Cale & Harris, 2009a). However, some studies throw some light on this matter. Pate and colleagues (1994) and Armstrong and Van Mechelen (1998) all concluded that the vast majority of adolescents meet the guideline of accumulating 30 minutes of moderate activity on most days (CDC, 2006), but few meet the guideline of engaging in three or more sessions per week of moderate to vigorous activity for 20 minutes or more at a time. Riddoch and Boreham (1995) declared that from the available literature they could not conclude with any degree of certainty whether young people are active enough for health purposes. The National Diet and Nutrition Survey (Gregory & Lowe, 2000) estimated the percentage of young people in England meeting the physical activity guidelines for young people proposed by the HEA (i.e. engages in activity of at least moderate intensity for an average of one hour a day) (HEA, 1998) to be approximately 60 per cent of boys and 40 per cent of girls. Furthermore, in the 15-18 age group, 56 per cent of boys and 69 per cent of girls did not reach the recommendations. The Taking Part Survey (2007) revealed that 45 per cent of adults do not allow their children to play outside with one of the reasons that it is too dangerous. This perhaps also explains why fewer children now walk or cycle to school. Since the early 1990s there has been a steady decrease in the number of children walking and cycling to school in the UK, with the proportion of children aged 5-10 who walk to school having fallen from 61 per cent in the early 90s, to 52 per cent in 2006 (Cale & Harris, 2009a). Such changes must have led to decreases in the physical activity levels of many children.

Some studies have suggested a consistent or even an upward trend in young people's physical activity levels. For example, Welsman and Armstrong (2000) concluded that

activity levels had not fallen dramatically over the period of a decade. In addition, as outlined earlier, the Health Survey for England has reported increased participation over time.

Cale and Harris (2009, p. 19-20) have summarised the findings and trends concerning pupils' physical activity:

1. Recent surveys suggest that 30 per cent and 40 per cent of boys and girls in the UK fail to meet physical activity recommendations, which means that a sizeable proportion of children are inactive and lead sedentary lifestyles.
2. National and international surveys reveal relatively good levels of participation, particularly in organised sport, among a significant proportion of children.
3. 'Polarization' of activity (where there are groups of extremely active and extremely inactive individuals) appears to be common in children.
4. Boys are more active than girls and the differences are more marked in vigorous activity.
5. Physical activity decreases with age with the teenage years being the time of greatest decline.
6. Children's physical activity patterns appear to be sporadic and highly transitory or changeable, with sustained periods of moderate to vigorous physical activity not being part of most children's lifestyles.

#### **2.6.1.4 Tracking Young People's Physical Activity Levels**

Another important question is whether or not activity experiences during childhood extend or influence adult activity behaviour because it is one of the proposed benefits arising from childhood physical activity (Blair et al., 1989). Physical activity tracking studies should not be only used to quantify whether a child maintains his or her relative rank for physical activity within a cohort of children over time, because they

are also useful predictors of a child's later physical activity behaviour, based on their initial behaviour (Pate et al., 1996). However, little is known about the tracking of physical activity, moderate to vigorous physical activity, and sedentary behaviour in young people (Kelly et al., 2007) as relatively few tracking studies are available. This is because they require longitudinal observations of the same individual for at least two points in time (Malina, 1996). Available studies reveal that higher levels of participation in physical activity at an early age increase the likelihood of participation as an adult (Armstrong & Biddle, 1992; Fuentes et al., 2003; Godin & Shephard, 1984; Gottlieb & Chen, 1985; Malina, 1989; Sofranko & Nolan, 1972; Vanreusel et al., 1993; Yoesting & Burkhead, 1973). Similarly, a twenty-one year tracking study conducted by Telama and colleagues (2005) indicated that school-age physical activity appears to influence adult physical activity. Lifelong habitual physical activity is likely to begin during childhood and adolescence (Armstrong et al., 1990; Bucher, 1974; Clarke, 1974; The Cooper Institute, 2007) and an inactive young child is unlikely to become a physically active adult (Armstrong & Welsman, 2000). However, Boreham and Riddoch (2001) have stated that the evidence for tracking of activity from childhood into adulthood is not strong.

Cale and Harris (2009, p. 20) summarise that there is some evidence that children's activity and inactivity tracks from childhood to adulthood – in other words, active children are more likely to remain and become active adults and vice versa. It can not be firmly established whether children's physical activity has decreased over previous generations or whether it has declined over recent years.

### **2.6.1.5 Summary**

Several consistent trends in children and young people's physical activity are evidenced from reviews and studies regardless of the method of assessment. Males

are more active than females of the same age between 6 and 17 years old. Furthermore, during childhood and adolescence, both boys and girls reduce their physical activity as they grow older, but the rate of decline in girls is greater than in boys. Young people's physical activity levels peak at around 13 to 14 years and noticeably declines from then on. The decline in physical activity is of concern, and a sizeable number of young people do not meet the physical activity guidelines, engaging in an average of one hour of at least moderate intensity physical activity accumulated over the day (Cale & Harris, 2009a; Cavill et al., 2001). From educational and physical activity promotion perspectives, it is important to monitor young people's physical activity levels and inform them of the importance of reaching the recommendations and helping them adopt active lifestyles.

## **2.6.2 Young People's Fitness Levels**

### **2.6.2.1 Cardiorespiratory or Aerobic Fitness**

Cale and Harris (2009a, p.17) have highlighted the following key findings and trends from the literature concerning children and young people's aerobic fitness:

1. Young people show a progressive, almost linear increase in aerobic fitness with age, although some studies show that from about 14 years, girls' peak VO<sub>2</sub> levels off or declines.
2. With body size appropriately controlled for, boys' aerobic fitness increases through childhood, adolescence and into early adulthood, whilst girls' increases into puberty and then levels off.
3. While data are limited, evidence indicates that maturation induces increases in aerobic fitness in both sexes, independent of those explained by body size, body fatness and age.
4. Boys' aerobic fitness is higher than girls', at least from late childhood, and there is

a progressive divergence in boys' and girls' values during the teenage years.

5. There is no evidence to suggest that low levels of aerobic fitness are common amongst children (Armstrong, 2004; Armstrong & Fawkner, 2007).
6. There is no convincing evidence to suggest that children's aerobic fitness has declined over time (Armstrong & Fawkner, 2007).
7. There is some recent evidence to suggest a 'polarization' in children's aerobic fitness (which is where there are extremes of fit and unfit children) is emerging with the difference increasing over time.

Boys' peak  $VO_2$  demonstrates a progressive, linear rise from 8-18 years of age (Armstrong & Welsman, 1994, 2000; Cunningham et al., 1984; Mirwald & Bailey, 1986). Girls' data show a similar trend but with more variation (Armstrong & Welsman, 2000). Girls' peak  $VO_2$  appears to increase with chronological age from 8 to 13 years but levels off or even falls in peak  $VO_2$  from the age of 13-14 years (Armstrong & Welsman, 1994, 2000; Nagawa & Ishiko, 1970). The Amsterdam Growth Study reported girls' peak  $VO_2$  to increase from 13 to 16 years of age before leveling off into adult life (Van Mechelen & Kemper, 1995). Boys' peak  $VO_2$  is generally higher than girls' through childhood and adolescence (Armstrong & Welsman, 2000; Cauderay et al., 2000). At 10 years old, boys' peak  $VO_2$  is 13 per cent higher than that of same aged girls, with the difference increasing to 37 per cent at 16 years of age (Armstrong & Welsman, 1994).

There is little scientific evidence confirming that young people's aerobic fitness levels are lower than 50 years ago (Armstrong & Fawkner, 2007; Armstrong & Van Mechelen, 1998; Armstrong & Welsman, 1997a; Rowland, 2002). They tell us that the aerobic fitness of children appears to have remained remarkably consistent over time. In contrast, a recent review of 33 studies of children's aerobic fitness from 27 countries over a 45-year period reported a global decline in children's aerobic

performance (Tomkinson, 2007; Tomkinson & Olds, 2007). Thus, in summary, there appears to be no firm evidence to suggest that low levels of aerobic fitness are common among pupils, and if pupils' fitness declinations, or not, over the years are still equivocal. At the same time though, we should bear in mind that there are many limitations with fitness testing and fitness data and many factors influence fitness test scores.

#### **2.6.2.2 Muscular Fitness**

Boys' muscular strength increases linearly with age from childhood until 13 or 16 years of age and there is a marked increase in muscular strength through puberty. After that, there is a slower increase into the early or mid-twenties (Beunen & Malina, 1988; Blimkie, 1989; Cauderay et al., 2000). Girls have a similar linear increase in muscular strength with chronological age until about 14-15 years (Asmussen, 1962; Cauderay et al., 2000; Malina, 1986). There is a considerable gender difference in muscle strength during puberty and most boys' strength is greater than girls' (Cauderay et al., 2000; Fehily et al., 1992; Ortega et al., 2008).

#### **2.6.2.3 Flexibility**

There is no significant difference in the 'sit-and-reach' scores of children aged 5-7 years (Fjortoft, 2000). Between the ages of 9 and 19 years, girls display better flexibility than boys (Cauderay et al., 2000). Similarly, a recent AVENA study found that girls had higher flexibility than boys through adolescence (Ortega et al., 2008). Leighton (1956) reported a steady downward trend in flexibility with age among 10 to 18 year old boys in the majority of joint movements.

#### **2.6.2.4 Body Composition**

Growing evidence supports the view that the body fatness of children and adolescents

is increasing (HEA, 1998b, WHO, 2000). The prevalence of young people's obesity is reported to range from 11.8 per cent (Fogelholm et al., 2007) to 27 per cent (Keaton et al., 2003). Other data generated from 11-16 year old subjects from the south of England revealed that 12.4 per cent of boys and 9.7 per cent of girls were 20 per cent above the Royal College of Physicians' recommended mass for stature and age (Armstrong & Welsman, 1997a). A more recent study conducted in the UK, indicated that the prevalence of overweight children aged 7-11 years rose from 8 per cent to 20 per cent in the period 1984-1998 (Lobstein et al., 2003). The levels of overweight/obesity prevalence based on BMI in the UK was 20 per cent for those aged 7-11 years and 21 per cent for adolescents aged 14-17 years (Lobstein et al., 2003).

## **2.7 Influence of Physical Activity and Fitness on the Health of Young People**

Given that the literature reveals that a number of young people are inactive, particularly girls, and that physical activity decreases with age, there are several reasons for encouraging young people to take part in physical activity from a public health perspective: to improve physical fitness, health and well-being; to change lifestyle and develop habits that can be sustained into adulthood; and to reduce the risk of chronic diseases (Cavill et al., 2001). An important question then is whether young people's physical activity and fitness levels do actually influence their health. Although more research is needed on the association between physical activity and health among young people (Alpert & Willmore, 1994; Armstrong & Simons-Morton, 1994; Bar-Or & Baranowski, 1994; Plowman, 2005), in recent years, there has been considerable interest in young people's physical activity and fitness. Concerns have been expressed about the possible negative health consequences of being inactive and/or unfit. In contrast, there is a strong agreement in the scientific community that

physical activity positively influences individual health status in children (Strong et al., 2005). Blair and colleagues (1989) proposed three possible benefits of adequate physical activity in childhood: (1) to improve childhood health status and quality of life; (2) to improve adult health status (for example, by delaying the onset of chronic disease in adulthood); (3) to increase the likelihood of maintaining adequate activity into adulthood, thus indirectly enhancing adult health status. Influences of physical activity and fitness on physical and mental health are reviewed in the next section.

## **2.7.1 Physical Health**

### **2.7.1.1 Coronary Heart Disease or Cardiovascular Disease**

Coronary heart disease (CHD) or cardiovascular disease (CVD) and the risk factors predisposed to CHD/CVD have been studied extensively in relation to physical activity and physical fitness. The relationship between physical activity or physical fitness and CVD is more difficult to establish in young people because CVD does not typically occur until adulthood (Stensel et al., 2008). Some studies (e.g. The Muscatine Study (Janz et al., 2002); the Northern Ireland Young Hearts Project (Boreham et al., 2002); the Danish Youth and Sports Study (Hasselstrom et al., 2002); the Leuven Longitudinal Study on Lifestyle, Fitness and Health (Lefevre et al., 2002); and the European Youth Heart Study (EYHS) (Wedderkopp et al., 2003)) have suggested that high physical activity during adolescence and young adulthood is related to a healthy risk factor profile later in life (Berenson et al., 1995; Thomas & Williams, 2008). Longitudinal studies, however, do not provide conclusive evidence that increasing physical activity and fitness in 'healthy' children improves their coronary risk profile during childhood and adolescence (Armstrong & Simons-Morton, 1994; HEA, 1997; Sallis & Patrick, 1994; Tolfrey et al., 2000). Twisk (2000) indicates that there is only a weak correlation between physical



activity/fitness and the risks of CVD in children and adolescents and that there is no evidence that physical activity and/or fitness during childhood and adolescence are related to CVD risk factors in adulthood. Likewise, Wedderkopp et al (2003) found only weak associations between fitness and CVD risk factors among young people (Wedderkopp et al., 2003). It thus remains to be seen whether improving physical activity levels during childhood and adolescence protects from chronic disease in young or adult life (Thomas & Williams, 2008; Warburton et al., 2006). Considerable follow-up periods would be required to provide definitive evidence of a link between physical activity or physical fitness in childhood and adolescence and subsequent risk of CVD (Stensel et al., 2008).

#### **2.7.1.2 Blood Pressure**

Riddoch (1998) reviewed a number of studies and reported that, with the exception of a study by de Visser and colleagues (1994), all found beneficial associations between measures of physical activity and blood pressure in children (Al-Hazzaa et al., 1994; Anderson, 1994; Boreham et al., 1997; Harrell et al., 1996; Strong et al., 2005; Webber et al., 1996). Furthermore, hypertensive adolescents who participate in regular aerobic activity have been found to benefit from a reduction in their systolic and diastolic blood pressures whereas normotensive individuals have not (Alpert & Willmore, 1994). However, Twisk (2000) suggested that there is only limited evidence that physical activity and physical fitness have beneficial effects on blood pressure in children and adolescents. Nevertheless, it is recommended that young people with hypertension participate in continuous moderate to vigorous aerobic activity to improve blood lipid profiles and reduce blood pressure (HEA, 1997).

#### **2.7.1.3 Blood lipids**

Limited studies have examined the relationship between physical activity and blood lipids in adolescents, and the results are inconclusive (Boreham et al., 1997). Armstrong and Simons-Morton (1994) indicated that the beneficial effect of exercise on blood lipids in adolescents is minimal, although there is some evidence that high-density lipoprotein cholesterol (HDL-C) concentrations might be enhanced. Riddoch (1998) proposed that physical activity has only weak associations with serum lipid and lipoprotein concentrations in young people. Tolfrey and colleagues (2000) reviewed and noted that correlational studies suggest that higher levels of physical activity may be related to a favourable lipoprotein profile, but long term investigations suggest exercise has only little influence. More recently, Weiss and Raz (2006) have highlighted that the association between physical activity and CVD risk observed in The European Youth Heart Study (EYHS) was independent of the degree of adiposity. They therefore suggested that physical inactivity is an independent CVD risk factor in young people.

#### **2.7.1.4 Body Fat**

Obesity is a major risk factor for insulin resistance and diabetes, hypertension, poor cardiorespiratory fitness and atherosclerosis (Boreham & Riddoch, 2001). Obesity also tends to track into adulthood (Clarke & Lauer, 1993; Hager et al., 1995). Some studies have shown an inverse association between physical activity levels and body fatness in children and adolescents (Boreham & Riddoch, 2001; Rowland et al., 2002; Saris et al., 2003; Steinbeck, 2001; Twisk, 2000), while other studies have not (Ekelund et al., 2005; Ekelund et al., 2001; Reilly, 2006; Ruiz et al., 2006). Furthermore, in a recent study on young people by Thomas and colleagues (2007), fatness rather than fitness was found to be independently related to CHD risk factors. Along with dietary and activity guidance (Hakanen et al., 2006), increasing physical

activity and decreasing sedentary behaviours may be an effective strategy in the management of body weight in young people (Atlantis et al., 2006; Strong et al., 2005; Watts et al., 2005).

#### **2.7.1.5 Bone/Skeletal Health**

Activity during childhood and adolescence is thought to have an important role in reducing the development of osteoporosis as it enhances peak bone mass during maturation (Bailey & Martin, 1994; Boreham & Riddoch, 2001; Drinkwater, 1995; Slemenda et al., 1991; Vicente-Rodriguez, 2006). A review of studies indicates that active adolescents have better skeletal mass than less active peers at most tested bone sites (Bailey & Martin, 1994; Bailey et al., 1999; McKay et al., 2005; Rowlands et al., 2002; Strong et al., 2005). Weight-bearing, strength-enhancing and resistance activity can promote skeletal health in young people, and are believed to reduce long-term risk of osteoporosis (Andreoli et al., 2001; Biddle et al., 2004; Cooper et al., 1995; Grimston et al., 1993; Lehtonen-Veromaa et al., 2000; Slemenda et al., 1994; Welten et al., 1994). Furthermore, McKay and colleagues (2005) have reported that a relatively low dose of activity performed daily is effective in increasing bone health in prepubertal and early pubertal children.

#### **2.7.1.6 Muscular Strength and Flexibility**

Appropriate muscular strength in conjunction with adequate joint flexibility may help to prevent muscular, joint and connective tissue injuries (Plowman, 1992) and to avoid or alleviate low back pain in adults (Corbin & Lindsay, 1984). There is also evidence that resistance training may have beneficial effects on blood lipids (Weltman et al., 1987), the blood pressure of hypertensives (Hagberg et al., 1984), and aerobic fitness (Docherty et al., 1987) during childhood and adolescence. Appropriate

strength exercises can also improve mental health (Hilyer et al., 1982; Holloway et al., 1988). The effects of long-term resistance training on children's and adolescents' cardiac dimensions and function, however, are unknown (Blimkie, 1993).

### **2.7.2 Mental Health**

The effect of physical activity on mental health in children and adolescents has received significantly less attention than among adult populations (Paluska & Schwenk, 2000). There is widespread belief that physical activity is inherently 'good' for young people with respect to varied psychosocial outcomes such as self-esteem, mental health, and cognitive functioning (Strauss et al., 2001; Tremblay et al., 2000), and that it is negatively related to depression (Motl et al., 2004; Tomson et al., 2003). Despite such claims, the evidence is not very clear (Biddle et al., 2004). Nevertheless, the potential psychological benefits of exercise in children and adolescents should not be ignored. Some literature indicates that young people who have a physically active lifestyle have been found to have a higher level of self-concept and self-esteem (Calfas & Taylor, 1994; Dunton et al., 2006; Gruber, 1986; Mutrie & Parfitt, 1998; Sonstroem & Morgan, 1989), especially amongst disadvantaged groups such as children with learning difficulties and children with low levels of self-esteem (Shields & Bredemeier, 1994). Tortolero and colleagues (2000) reviewed 48 articles and found the benefits of being physically active for young people to include improved self-efficacy and self-esteem, greater perceived physical competence, greater perceived health and well-being, and decreased depression and stress. Physically active adolescents also have relatively lower anxiety and perceived stress (Calfas & Taylor, 1994; Cavill et al., 2001; Dyer & Crouch, 1987; Fox, 1991; Norris et al., 1992; Strong et al., 2005). In a two-year longitudinal study, Motl and colleagues (2004) provided strong evidence for a relationship between physical activity and symptoms

of depression in adolescents.

It seems then, that available evidence is equivocal and not extensive (Stensel et al., 2008). However, it does suggest that physical activity can enhance self-esteem and reduce symptoms of depression and anxiety. The beneficial effects are likely to be greater in those who have poorer mental health at baseline.

### **2.7.3 Benefits of Physical Activity to Young People**

An appropriate amount of physical activity is widely acknowledged as beneficial to young people's health and fitness. However, much research still needs to be conducted regarding the association between health and young people's activity and fitness (Eisenmann, 2004; Plowman, 2005; Rowland & Freedson, 1994). Riddoch (1998, p.30) has commented that 'No single study, or set of studies, has provided definitive evidence that a meaningful gain in health is achieved through being an active child'. Boreham and Riddoch (2001) also considered whether physical activity or physical fitness has a stronger impact on children's health status. It seems that strong empirical evidence that physical fitness and physical activity during childhood have a major impact on current or future health is yet to be established (Cale & Harris, 2006). Data on young people's health are difficult to obtain due to: (1) a lack of large-scale longitudinal studies; (2) difficulties in measuring physical activity, fitness and health in children; (3) insufficient time for physical inactivity to have demonstrated influences on risk factors; and (4) insufficient data for the effects to demonstrate the relationship between health and fitness or physical activity levels.

A recent 23-year longitudinal study (The Amsterdam Growth and Health Longitudinal Study (AGAHLS)) (Kemper & Koppes, 2006) indicated that their research findings did not support the hypothesis that physical activity affects aerobic fitness. They propose that genetic factors (Bouchard et al., 1997) are more important

than environmental factors with respect to aerobic fitness.

The available evidence about the health benefits of physical activity is not strong, which may seem disappointing, but the associations are generally in the positive direction. Also, absence of evidence may not indicate evidence of absence (Armstrong & Welsman, 1997c). Subtle relationships may exist which have not been detected. There remains a lack of firm evidence from controlled trials to show that physical activity is effective in modifying health risk in young people. Harris and Cale (2006) and Cavill and colleagues (2001) consider that it is unwise and dangerous to conclude that the lack of definitive data on the health benefits of young people's physical activity and fitness means that they are not important for their health.

## **2.8 Range of Physical Education Models Used in Schools**

### **2.8.1 Introduction**

In order to better understand the contexts and parameters within which health, physical activity and fitness monitoring might take place within the curriculum, definitions of physical education are considered in this section, followed by a review of a range of models of physical education instruction in the school setting. The physical education model ties together theory, planning, classroom management, teaching learning processes, and assessment. The model approach is intended to address long-term learning outcomes (Metzler, 2000), promote specific learning objectives, and could include multiple teaching methods, strategies, or styles within units. In 1999, the Qualifications and Curriculum Authority and Department for Education and Employment (QCA & DfEE) defined the importance of PE within the National Curriculum. Physical education develops pupils' physical competence and confidence, and their ability to use these to perform in a range of activities. It promotes physical skillfulness, physical development and knowledge of the body in

action. Physical education provides opportunities for pupils to be creative, competitive and to face up to different challenges as individuals and in groups and teams. It promotes positive attitudes towards active and healthy lifestyles (QCA & DfEE, 1999, p.15).

### **2.8.2 From Methods to Models**

Traditionally, direct and formal instructional methods dominated how teachers delivered PE classes. Nonetheless, this type of instruction, whilst not necessarily considered to be the most appropriate practice today, was found to be effective in teaching military drills (Van Dalen & Bennett, 1971). In the 1960s, physical educators expanded the PE method of instruction to include different teaching strategies and styles. A teaching strategy is a set of pre-planned actions intended to bring about a specific short-term goal within the lesson or content unit (Metzler, 2000). Teaching strategies are built upon the teacher's knowledge base and rely strongly on procedural and conditional expertise in physical education. The term 'teaching style' has no agreed definition but more widely accepted definitions refer to it as 'a set of teaching tactics' (Galton et al, 1980) or 'instructional format' (Siedentop, 1991). Mosston and Ashworth (1986) define according to Doherty (2003) a list of teaching methods:

1. Command - teacher makes all decisions.
2. Practice - students carry out teacher-prescribed tasks.
3. Reciprocal - students work in pairs: one performs, the other provides feedback.
4. Self-check - students assess their own performance against criteria.
5. Inclusion - teacher planned; students monitor own work.
6. Guided Discovery - students solve teacher set movement problems with assistance.

7. Divergent - students solve problems without assistance from the teacher.
8. Individual - teacher determines content; students plan the programme.
9. Learner Initiated - student plans own programme; teacher is advisor.
10. Self Teaching - student takes full responsibility for the learning process.

A focus on both strategies and styles opened up new possibilities to deliver content and develop new teaching methodologies for physical educators. In the 1980s, the concept of 'effective teaching' required physical education to shift from 'teaching for passive learning' to encouraging 'active learning'. This changed the focus of PE from 'what should the teacher be teaching?' to 'how should the teacher be teaching?' This notion promoted new teaching methods, strategies and styles that were helpful in expanding the limited and narrow approaches of the past.

Joyce and Weil (1972, p.1) made a case that instructions should be 'structured, logically consistent, cohesive, and lucidly describe patterns of teaching'. An instructional model comprises 'a plan or pattern that can be used to shape the curriculum (long-term courses of studies), to design instructional materials, and to guide instruction in the classroom and other settings' (Joyce & Weil, 1972). Each distinctive set of patterns is referred to as a *teaching model*. Model-based physical education instruction helps teachers to learn about, select, and practise comprehensive patterns of teaching. Many articulate and effective models have been developed and adapted to physical education, such as 'Cooperative Learning', 'Personalized Systems for Instruction (PSI)', 'Direct Instruction', 'Sport Education' and 'Tactical Game', the features of which are explored later on.

The most effective teachers will be familiar with a number of models and be able to use the right tool for the right job (Metzler, 2000). Good instructional models require teachers to consider factors such as their theory, intention, outcomes, planning,



classroom management, teaching learning processes, and assessment before making key decisions about how to instruct students (Metzler, 2000). When an appropriate model is selected for a specific learning objective that meets the contextual demands of the teaching unit and is implemented in accordance with the model's design, it will be effective in enhancing students' learning (Metzler, 2000).

### **2.8.3 Instructional Models for Physical Education**

An 'instructional model' refers to a comprehensive and coherent teaching plan including: a theoretical foundation, statements of learning outcomes, the teacher's knowledge and expertise, appropriate and sequenced learning activities, expected behaviours from the involved parties (the teachers and the students), unique task structures, methods of assessing the learning outcomes, and ways to evaluate effectiveness of the implementation of the model itself (Metzler, 2000). Several instructions and models are introduced in the following section, and their applicability to monitoring health, activity and fitness will be critiqued in the section summary.

1. **Direct Instruction:** The model is centered on teachers' decisions and instructions with scripted lesson plans. With specific learning goals in mind, the teachers present to the students a model of the desired movement, skill, or concept, and then group and regroup the students based on their rate of progress through the programme. Direct instruction provides an efficient use of class time and resources, and is intended to promote high rates of participation in practices and drills. Teachers act as the instructional leader (Rosenshine, 1979) and are trained to emphasise the pace and efficiency of the instructions. It essentially gives the students as many practice attempts as possible so that teachers can monitor these and deliver equally high rates of feedback (Metzler, 2000). The frequent assessments involved with direct intervention also provide

high rates of feedback. Within this model, students make few decisions and rather just follow the teachers' directions and respond to questions when asked.

2. **Personalised System for Instruction (PSI):** The goal of this model is to allow students to be independent learners and for teachers to interact frequently with students who may need help (Metzler, 2000). This model allows students to progress as fast as they can, or as slowly as they need (Keller & Sherman, 1974; Metzler & Sebolt, 1994). In other words, PSI is designed to allow each student to progress at his/her own pace through a sequence of learning tasks. It relies on a unified plan with no daily lesson plans. Students progress individually through the sequence of tasks and begin each lesson from where they left off previously. Teachers only need to be aware of which tasks will be attempted in the upcoming lesson and provide the necessary equipment for the students (Metzler, 2000). Information about class management, learning tasks and assessment are provided through a course workbook and instructional media. It is an effective/useful model when teaching sports skills, because pupils' ability will influence the progress of their learning.
3. **Co-operative Learning:** The goals of this model are: (1) to foster academic co-operation among students, (2) to encourage positive group relationships, (3) to develop students' self-esteem, and (4) to enhance academic achievement (Hilke, 1990). Within this model, all members work to achieve a common goal and the group has not achieved it until all of its members have (Metzler, 2000; Slavin, 1983). The co-operative learning model is thus based on a set of related instructional strategies involving team rewards, individual accountability, and equal opportunity for success for all students. It is both achievement-based and process-based. The former means that the model is designed to foster student mastery of the instructional unit's content. Emphasis is placed on student

learning. Process-based means that the ways in which students interact with each other are equally important, and in fact facilitate each student's achievement. In co-operative learning, students are not required to 'learn to cooperate' but students must 'cooperate to learn' (Metzler, 2000, p.223). This model aims to provide practical and educational experiences in PE that are rich in value (Hellison & Jemplin, 1991; Siedentop, 1998)

4. **The Sport Education Model:** In this model, all students are players and they also learn one or more additional roles such a coach, referee, trainer and timekeeper. They learn the skills, decision-making, customs, and responsibilities associated with these roles and are active participants. For example, students who become coaches are responsible for team selection, position assignment, practice planning, and game strategy. The model can provide a deep, broad, and positive educational sport experience (Metzler, 2000), and its major goal is to nurture competent, literate, and enthusiastic sportspersons (Siedentop, 1998).
5. **Peer Teaching Model:** This model is associated with the notion of 'I teach you, you teach me' (Metzler, 2000), p.287). Teachers retain control over all content, managerial tasks and instructional decisions with the exception of the instructional interactions that occur during and after students' learning attempts. Some students are trained and delegated to observe and analyse the practice attempts of other students, acting as the tutors. With undeterred concentration, the tutors must pay attention to the tasks presented and the structure given by the teachers, have good verbal communication skills and be socially sensitive. Meanwhile, the learners must be willing to accept their tutor's comments, ask questions, and practise diligently under the direct observation of each attempt.
6. **Inquiry Teaching:** This model views the learners as the problem solvers (Metzler, 2000). Within this model, teachers give pupils opportunities to explore

learning through the dynamic process of 'inquiring', to develop their keen sense of relevance and train them to ask and answer questions confidently and not be afraid of being wrong. The model does not have a fixed teaching structure, but is initiated, based on the principle of the 'inquisitive mind of a good learner'. The students are encouraged to ask relevant questions and teachers are advised to avoid giving 'definite' or 'dead end' answers. Rather, their responses are intended to encourage or trigger more relevant questions from the students. Some physical education curricula are strongly based on inquiry teaching, such as movement education, games education, and skill themes (Graham et al., 1998) which all promote the development of students' intellectual abilities and help them to be expressive, creative, and skillful. It could lead to increased enjoyment and additional participation in physical activity by stimulating positive experience (Metzler, 2000).

7. **The Tactical Games Model:** This model is also known as the 'teaching games for understanding' approach. As the name indicates, the main theme of the model is tactical and it focuses on the combination of strategy and skill needed to perform in a game. In this model, teachers plan a sequence of learning tasks embedded into games to develop students' skills and tactics, leading to modified or full versions of the game. The goal of this model is to develop students' tactical knowledge in scaled-down versions of the game in preparation for real full game applications (Metzler, 2000).
8. **The Multi-Activity Model:** The goals of the multi-activity model are to expose pupils to many different activities and encourage active participation. Students experience a wide variety of physical activities in a few consecutive units – usually over 2-3 weeks. This approach is flexible because units can be added or subtracted without affecting the rest of the programme (Hellison & Jemplin,

### 2.8.4 Summary

Teaching models aim to advance teaching theory, planning, performance and assessment, combine related teaching methods, and, most importantly, address long-term learning outcomes (Metzler, 2000). Although the models each have their own characteristics, they have a common purpose - to increase students' learning achievement in physical education. Selecting the right tool for the right job is the challenge for teachers who need to be familiar with a range of instructional models and consider all factors before deciding which models to deploy to achieve the desired learning outcomes.

In order to improve pupils' knowledge and understanding of health, physical activity and fitness, eight instructional models for physical education have been reviewed in this section. The Direct Instruction model gives students few rights to make decisions and their learning is passive. In other words, if there is no teacher instruction or requirement, students will not be able to accomplish the learning by themselves. Thus, in order to shift away from the traditional teacher-centered learning process and to empower students to make decisions, the Direct Instruction model is not particularly suitable for use in the monitoring of students' health, physical activity and fitness.

Some models can be more appropriately employed by PE teachers, for example, the Personalised System for Instruction (PSI) model could prevent some pupils from feeling embarrassed or wanting to avoid PE (Keller & Sherman, 1974; Metzler & Sebolt, 1994). Also, the Co-operative Learning model can provide students with opportunities to discuss the importance and purpose of monitoring with their peers and learn how to implement monitoring. The Peer Teaching model also has great

potential in enhancing students' cognitive development in physical education (Metzler, 2000) and could be employed when implementing 'knowledge and understanding' education. In the Inquiry Teaching model, students' cognitive and affective learning towards health, activity and fitness could be promoted by engaging the learners' attention and instilling positive learning attitudes (Metzler, 2000). Other models such as the Sport Education model, the Tactical Games model and the Multi-Activity model could be partly used to develop pupils' learning and foster interest in monitoring their health, physical activity and fitness.

## **2.9 Approaches to Promoting the Concept of 'Total Health' to Children**

It is necessary to review and critique approaches and models employed in health promotion to build a theoretical framework for recommendations relating to monitoring pupils' health within the PE curriculum. Health promotion, for some, is an activity synonymous with health education; for others, it is a related but substantially different process, having different goals and values (Tones & Tilford, 1994). Health promotion is neither neutral nor value-free. Its protagonists hold very different ideas about priorities and strategies which reflect their underlying values. Health promotion is a contested subject for discussion as it is broad and ever changing. Some terms such as 'health education' and 'public health' have shifted their meanings over time (Tones & Tilford, 1994).

Schools are the porthole to health promotion as they are one of the primary environments pupils are exposed to. An effective school health programme can be one of the most cost effective investments a nation can make to simultaneously improve education and health. WHO promotes school health programmes as a strategic means to prevent important health risks among youth and to engage the education sector in efforts to change the educational, social, economic and political conditions that affect

risk ([www.who.int/school\\_youth\\_health](http://www.who.int/school_youth_health)). Initially, health education started as an offshoot of environmental work and focused on information-giving and home visiting to instill housekeeping and mothering skills (Katz & Peberdy, 1997). In the twentieth century, health education shifted in emphasis from environmental to interpersonal interventions (Katz & Peberdy, 1997). In the 1950s, health education became associated with broad programmes of popular education. With mass public campaigns and adult education classes designed to persuade people to change their behaviours, health education encouraged pupils to look after themselves and to take greater responsibility for their own health (Health Education Council (HEC), 1978). Further developments from the 1980s onwards saw health education evolve from persuading individuals to change their personal behaviour to empowering people to make autonomous decisions (Katz, 1997). Physical education is often viewed as a primary vehicle for the delivery of the physical activity dimensions of health (Green, 2000). Health promotion through physical education depends on the ability of schools to convey knowledge, understanding, skills and attitudes that are conducive to the promotion of health (McKenzie, 2001a). Different approaches to health promotion and health education are reviewed and critiqued in this section.

### **2.9.1 Health Promotion Approaches**

Ewles and Simnett (1999) have identified and considered the value of five approaches to health promotion. These range from 'medical' interventions which encourage patient compliance to approaches that involve persuading people to seek early treatment and change their lifestyle, to approaches that advocate 'change to the physical and social environment'. These approaches and their relevance and applicability to a school setting are considered below. Reviewing and critiquing these health promotion approaches can help to provide a theoretical framework for

recommendations associated with monitoring health, physical activity and fitness within the school curriculum.

1. **The Medical Approach:** The aim of this approach is 'freedom from medically-defined disease and disability', such as infection, cancer or heart diseases (Ewles & Simnett, 1999), and the prevention of morbidity and premature mortality (Naidoo & Wills, 1998). The approach is conceptualized around the absence of disease and involves medical interventions such as immunization and screening to prevent or ameliorate ill-health.

The approach, however, does not seek to promote positive health and could be criticised for ignoring the social and environmental dimensions of health. The medical approach is an 'expert-led' or 'top-down' type of intervention which requires an infrastructure with trained personnel, equipment and laboratory facilities, and information systems that determine who is eligible for the procedure. This approach to health promotion can be complex, and may depend on the establishment of national programmes or guidelines (Ewles & Simnett, 1999; Naidoo & Wills, 1998). This approach is not therefore particularly applicable to schools due to the complexity, practicalities and costs associated with employing the services of professionally trained medical personnel and specialised equipment.

2. **The Behaviour Change Approach:** The aim of this approach is to change people's attitudes and behaviour (Ewles & Simnett, 1999) and to encourage them to adopt a healthy lifestyle, which is seen as the key to improving health (Naidoo & Wills, 1998). The approach views health as the property of the individual and it is therefore possible to assume that people can make real improvements to their health by choosing to change their lifestyle. This is also an 'expert-led', 'top-down' style of approach. There is a complex relationship, however, between



an individual's behaviour and social and environmental factors as changes may only become apparent over a long period of time. It may also be difficult to isolate or attribute any change to health promotion interventions (Naidoo & Wills, 1998). In the school setting, although this approach encourages students to make improvements to their lifestyle, its traditional 'expert-led' and 'top-down' style provides few opportunities for students to think or learn independently. Monitoring lifestyle behaviour change and attributing any changes to the approach is also difficult.

3. **The Educational Approach:** The aim of this approach is to give information, ensure knowledge and understanding of health issues (Ewles & Simnett, 1999), and to help individuals develop skills to make an informed choice about their health behaviour (Naidoo & Wills, 1998). It is different from the behaviour change approach in that it does not set out to persuade or motivate changes in a particular direction. Information about health is presented, and people are guided to explore their own values and attitudes, and to make their own decisions.

The approach, however, rather simplistically assumes a relationship between knowledge and behaviour - namely that increasing knowledge will result in a change in attitudes and behaviour. However, information alone may not be motivating enough to change behaviour, nor can it guarantee the development of the same values for different recipients (Naidoo & Wills, 1998). The observed change may also not be the change the health promoter predicted or had in mind. Thus, the importance and value of this educational process is to respect the individual's right to choose their own health behaviour and to recognise it as their responsibility to raise the health issues they are interested in (Ewles & Simnett, 1999). In a school setting, it permits students to make their own decisions about health and their health behaviours. Some young people may not adopt healthier

lifestyles due to limited understanding, motivation and/or the resources and support to do so. It may, however, be successful in informing students about the importance of a healthy active lifestyle.

4. **The Client-Centred (Empowerment) Approach:** The aim within this approach is to work with clients to help them identify what they are concerned about and want to take action on, and to gain the skills and confidence to make their own decisions and choices according to their own interests and values. It is a 'bottom-up' strategy, whereby the health promoter acts as a facilitator with the objective of helping clients to identify their health concerns and improve areas, and then withdraws from the situation (Ewles & Simnett, 1999; Naidoo & Wills, 1998). Within this approach, self-empowerment of the client is critical in increasing people's control over their own lives. Empowerment is also described as a method that increases people's ability to change their 'social reality' (Naidoo & Wills, 1998). The process of empowerment and networking is long term. This makes it difficult to be certain that any changes detected are due to the intervention and not other factors. It is also difficult to withdraw from the situation because it depends on young people being able to identify their health needs which they may not be able to do very effectively. In order to encourage students to take responsibility for their health and to experience the process of decision-making, this model could be utilized within the school curriculum.
5. **The Social Change (Radical) Approach:** The aim here is to affect changes to the physical, social and economic environment in order to make it more conducive to better health for the general public. Its focus is at the policy or the environmental level, with the aim being to bring about changes in the physical, social and economic environment, rather than changes in individual behaviour. The phrase 'to make the healthy choice, the easier choice' sums up the principle behind this

approach in that it not only aims to make healthy choices available, but also realistic in terms of cost, availability and accessibility (Ewles & Simnett, 1999; Naidoo & Wills, 1998). The social change approach is 'top-down' and the changes being sought are generally within organizations and require commitment from the highest levels. The approach has to be supported by public knowledge of its importance. It also relies on skills such as lobbying, policy planning, negotiating and implementation (Naidoo & Wills, 1998).

## **Summary**

In a school context, the attitude of headteachers and heads of departments are key, as they influence the policies and practices within the school and PE curriculum respectively. For example, they influence the investment in and utilization of the school's facilities and recreational areas, and the time allocated to PE. These decisions affect the physical activity participation of pupils. In summary, different approaches to health promotion have distinctive priorities and objectives and all are valid in their own right. The approaches are not discrete. For example, a community health project might include aspects of the educational approach (providing health information) and social change (lobbying for a change to local policy).

### **2.9.2 Health Promotion Models**

One of the purposes of this study is to propose recommendations for monitoring pupils' health, physical activity and fitness within a school PE curriculum. Reviewing and critiquing existing health promotion models could provide a theoretical framework for recommendations.

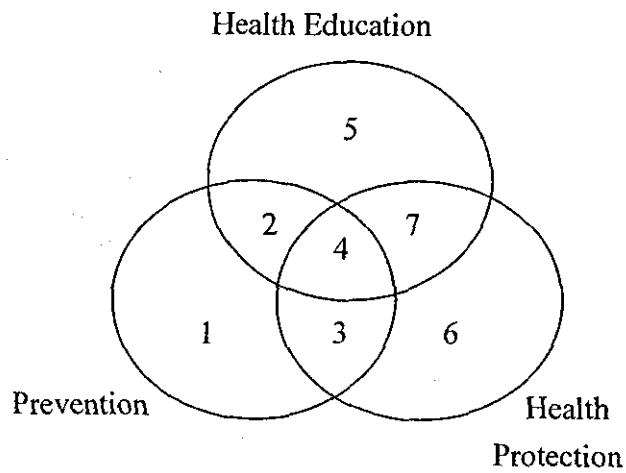
The term 'model' is a theory driven construction that, ideally, encapsulates the essence of the formulation of a particular aspect of reality. A good model construct

represents reality in a simplified form and this simplification should clarify thinking and facilitate planning (Tones & Tilford, 1994) and help to encourage theoretical thinking and identify new strategies and ways of working (Naidoo & Wills, 1998). The definitions of the 'model' in health promotion are different from the physical education model. The health promotion models do not focus on classroom management specifically, but, more generally, on the whole society, community, policy and public organisation. However, both models address long-term learning outcomes and include multiple teaching methods, strategies, or styles within units.

A proliferation of models has emerged and been debated in health promotion literature. Rawson (1992) points out that such debate may be viewed as a healthy sign of an emerging concern to develop a sound theoretical basis for action. Some of the more common health promotion models are presented and critiqued below.

#### **1. Tannahill (1985)**

This model of health promotion is widely accepted by health care workers and is intended as a framework for defining, planning, and executing health promotion. It is primarily descriptive of what goes on in practice. According to the model, health promotion comprises three overlapping activities: health education, health protection and prevention. Seven domains may be distinguished within this model, as explained in Figure 2.1.



1. Preventive services (e.g. immunization, cervical screening).
2. Preventive health education (e.g. smoking cessation advice and information).
3. Preventive health protection (e.g. fluoridation of water).
4. Health education for preventive health protection (e.g. lobbying for seat-belt legislation).
5. Positive health education (e.g. lifeskills work with young people).
6. Positive health protection (e.g. workplace smoking policy).
7. Health education aimed at positive health protection (e.g. lobbying for a ban on tobacco advertising).

Fig 2.1 Tannahill's Model of Health Promotion (Downie et al., 1996, p.59)

## 2. Tones and Tilford (1990)

Tones has formulated a simple equation that health promotion is an overall process of healthy public policy  $\times$  health education. Within this model of health promotion, the achievement of equity is considered to be the underlying goal of health promotion (i.e. a fair distribution of power and resources). Whether the goal is achievable or not depends on the prevailing environmental and social circumstances. 'Educational',

'preventive', and 'radical' approaches to health education/promotion each have their merits within this model, and all take 'achieving empowerment' as a key success criterion in health education and health promotion (Tones & Tilford, 1994). Furthermore, within this model, health education is seen as a driving force empowering professionals through raising their consciousness of health issues, policies and choices. Through health education, communities and professional health bodies can influence the environment and social circumstances in order to change and begin to affect the transformation and improvement of health (Figure 2.2).

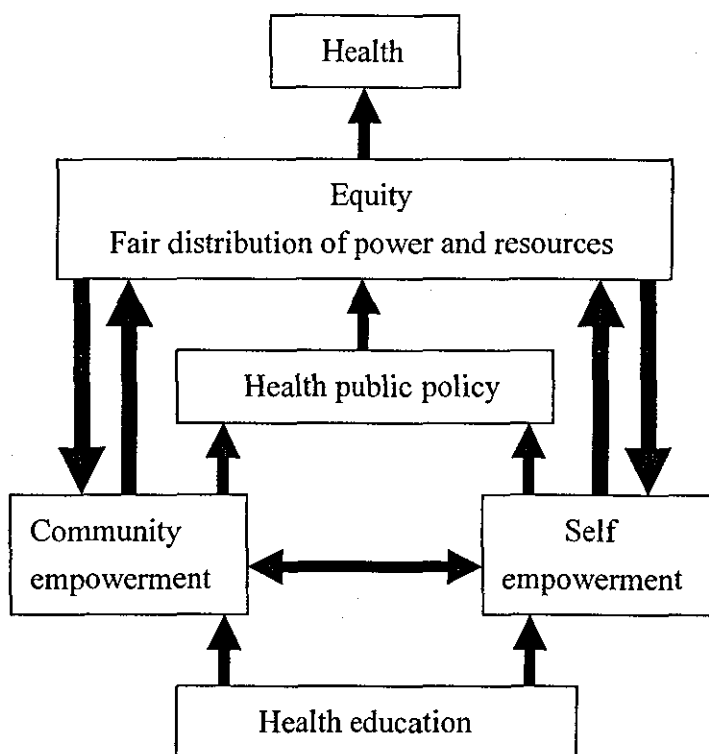


Figure 2.2 Tones' Model of Health, Education, Empowerment and Health Promotion (Tones & Tilford, 1994)

### 3. Caplan and Holland (1990)

This model is based on the belief that the approach to health promotion is mainly affected by two correlated factors – the knowledge of the promoting bodies and the

inertia of society. According to the model, knowledge is polarized as either objective or subjective and societal inertia as radically changing and socially regulated. The model correlates two factors perpendicularly and derives four perspectives or paradigms. Each paradigm, based on the polarities of the knowledge and societal inertia, represents a different approach respectively. The four promotional approaches are outlined below (Figure 2.3):

- a. The traditional perspective:** The medical and behaviour-change approaches are categorized under the traditional perspective. Its emphasis is on information-giving to bring about behaviour change. Knowledge within this perspective lies with experts.
- b. The humanist perspective:** relates to the educational approach. Individuals are enabled to use their personal resources and skills to develop a lifestyle they consider to be healthy.
- c. The radical humanist perspective:** relates to the empowerment approach. Health promotion is concerned to raise consciousness and the emphasis is on the exploration of personal responses to health issues. Individuals are encouraged to form social, organizational and economic networks.
- d. The radical structuralist perspective:** is based on the belief that inequalities cause many health problems, and the role of health promotion is to address the relationship between health and people within different social classes.

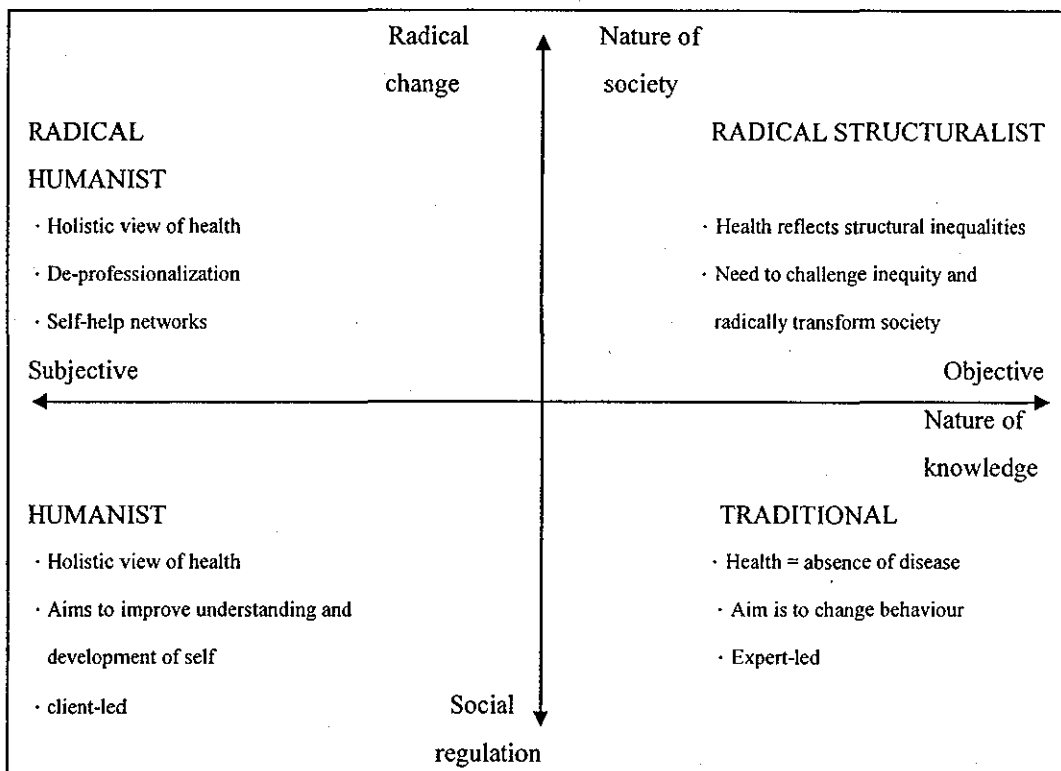


Figure 2.3 Four Paradigms or Perspectives of Health Promotion (Caplan & Holland, 1990)

### 2.9.3 Physical Activity Promotion Models

There are many approaches to health from the point of view of well-being or wellness (Hoeger & Hoeger, 1995), some of which provide practical advice on how to achieve a physically active lifestyle (Biddle, 1991; Biddle et al., 1998). Motivation plays a major role in promoting healthy, active lifestyles amongst young people. The stability of internal regulation during the teenage years is a good predictor of whether an individual is likely to remain physically active later in life (Soos et al., 2007). Some models and theories which could be employed to explain physical activity promotion are explored in this section.

#### 1. Precede-Proceed Model (Green & Kreuter, 1999)

In the precede-proceed model (Figure 2.4), health behaviour is affected by various predisposing, enabling and strengthening factors, as well as environmental factors.



Predisposing factors include individual values, attitudes, experiences, knowledge and opinions, which may increase or decrease motivation towards behavioural changes. Enabling factors include skills and resources and hindrances that facilitate or hinder wanted behavioural and environmental changes. They also include intrinsic expectations and external stimuli. Research findings have revealed that factors such as perceived risk of heart disease or perceived easiness of exercise are associated with physical activity behaviour. Strengthening factors include external social support from peers, feedback, encouragement and rewards after adopting a new behaviour style, and intrinsic factors such as joy, satisfaction and perceptions of the meaning of exercise. Physical, social and economical factors related to the individual which may support wanted behaviour are examples of environmental factors (Soos et al., 2007). If enabling, predisposing and strengthening factors are versatile, intensive and have an effect simultaneously, the probability of physical activity is greatest. When a person is aware of the importance of physical activity, has opportunities to exercise and is supported by their family, the situation is optimal (Soos et al., 2007).

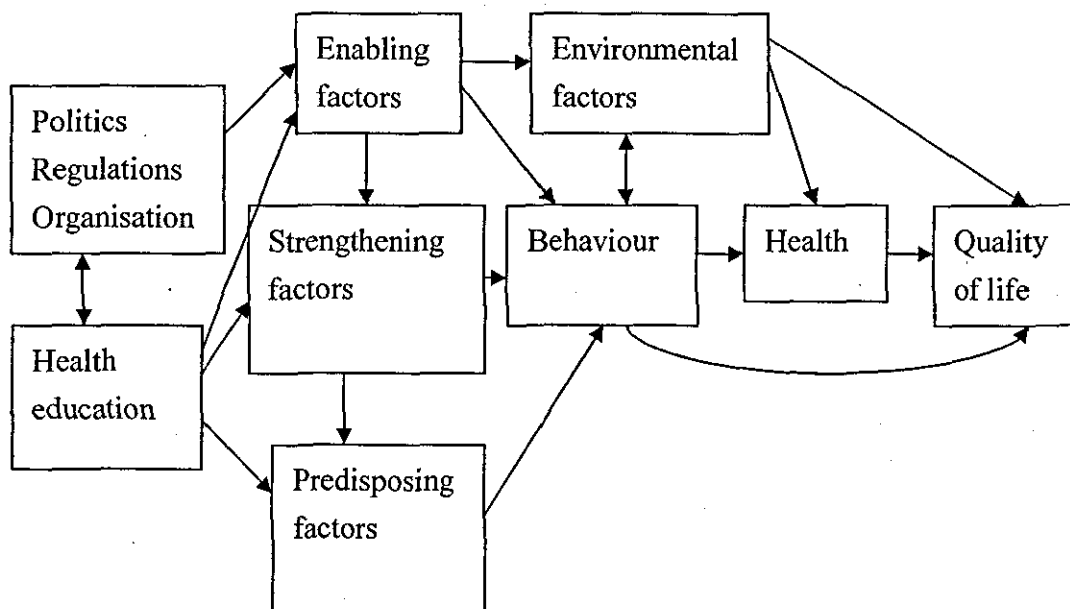


Figure 2.4 Precede-Proceed Model (Green & Kreuter, 1999).

### **3. Exercise Behaviour Model (Noland & Feldman, 1984)**

The Exercise Behaviour Model (see Figure 2.5) has been modified from the Health Belief Model (Rosenstock, 1974). It is a theoretical model of exercise behaviour which clarifies the role of various factors affecting human decision-making related to participation in physical activity. In the model, four predispositions influence readiness for exercise: perceived control over exercise; attitudes towards physical activity; self concept; and exercise-related values such as health, physical appearance and physical fitness.

Modifying factors affecting readiness to exercise include demographic, social, structural and physical variables, as well as cues to action such as health problems, health education, advice from others, exposure to those who exercise, and the media. The final decision about exercise is made as a result of the comparison process of perceived benefits of, and barriers to, action. According to the model, if individuals perceive the barriers to be stronger than the possible benefits of exercise, they will not be physically active. This model can be utilised in planning for the promotion of physical activity. In addition, removing any perceived barriers may help to lower the threshold for starting to exercise (Soos et al., 2007).

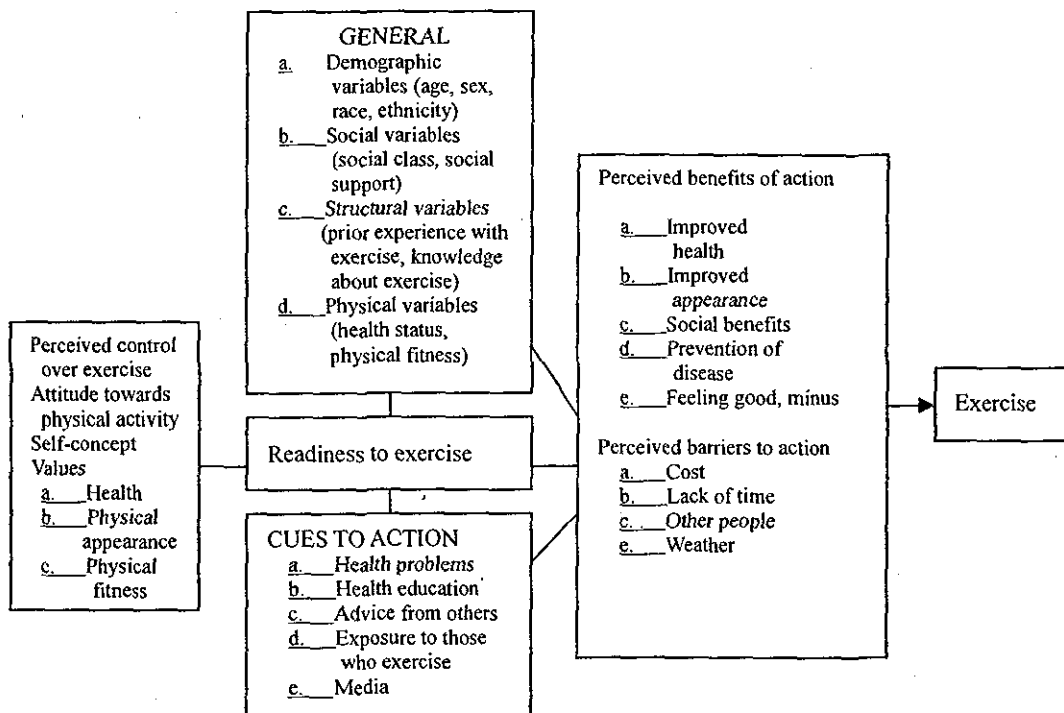


Figure 2.5 Exercise Behaviour Model (Normal & Feldman, 1984)

### 3. Stages of Change Model (Prochaska & DiClemente, 1983)

A contemporary topic in exercise and health psychology is the behavioural determinants at various stages of health behaviours. The stages of change model (see Figure 2.6) was developed on the basis of studies of Prochaska and DiClemente (1983, 1985), who named it the transtheoretical model. The model defines the processes of change as the cognitive, affective and behavioural strategies and techniques people use as they progress through the different stages of change over time. It was a relevant frame of reference in research on behavioural change in the context of physical activity and health (Soos et al., 2007).

The model identifies five stages of change (Marcus & Forsyth, 2003). In the precontemplation stage, the individual is not currently exercising and has no intention of doing so in the near future. In the contemplation stage, the individual is not currently exercising, but intends doing so in the near future. In the preparation phase, the individual is currently exercising, but only sporadically. In the action phase, the

individual is currently exercising according to the recommended amount and intensity, but the involvement has continued for less than half a year and exercise is not yet habitual. In the final maintenance stage, the individual has been exercising for more than half a year and exercise has become an established and stable custom.

It is important to take into account the individual needs of those at various stages of change when planning exercise consultancy and interventions. In the pre-contemplation phase, information about healthy behaviour could influence people. For those in the preparation phase, it is recommended that individuals are advised to gradually participate in longer periods of exercise in order to achieve the recommended level for health.

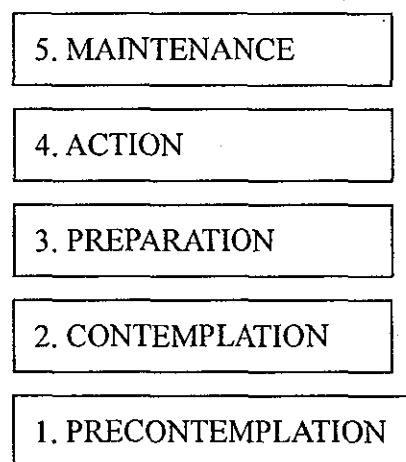


Figure 2.6 Prochaska and DiClemente's (1985) Stages of Change Model Applied to Physical Activity (Marcus & Forsyth, 2003)

#### **4. Theory of Planned Behaviour (Biddle & Mutrie, 1991)**

The theory of planned behaviour (see Figure 2.7) aims to explain that behaviour is a continuation of the theory of reasoned action. The theory suggests that starting and continuing physical activity are associated with the individual's expectations about the outcomes of exercising and how much they value the assumed outcomes (Smith

& Biddle, 1995). It is hypothesized that commitment is associated with positive emotions towards the activity and the perception that one is able to control the situation (Doganis & Theodorakis, 1995).

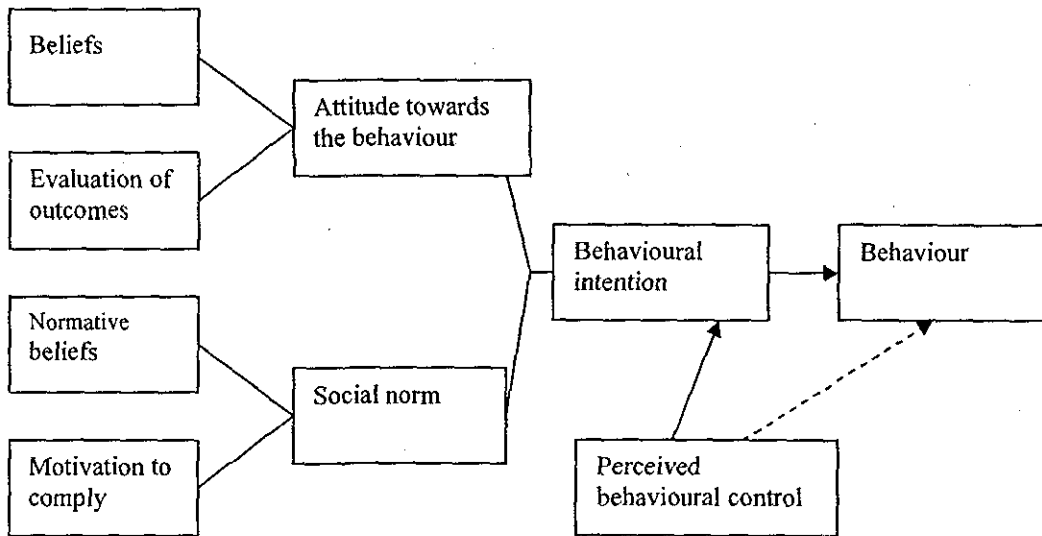


Figure 2.7 Theory of Planned Behaviour (Biddle & Mutrie, 1991)

### 5. Ecological Models of Physical Activity (EMPA) (Spence & Lee, 2003)

Traditional physical activity promotion interventions that employ individual approaches have demonstrated limited success in promoting long-term maintenance of physical activity (Dishman & Buckworth, 1996; Marcus & Forsyth, 1999). The limitations with individual approaches are that they tend to hold individuals responsible for their health or behaviour, assume they have control and the capacity to make decisions, and fail to acknowledge the influence of other factors in the physical and social environment. However, young people in particular often have limited control over, or decision making opportunities with respect to, their lifestyles and behaviours, and other factors are arguably more influential (Cale & Harris, 2009b). One alternative model of physical activity promotion that focuses not only on the individual but also on the social and environmental factors that may facilitate or

inhibit individual behaviour (Banks-Wallace, 2000; Dezwaltowski, 1997; Sallis & Owen, 1997) is the ecological model.

Within Spence & Lee's (2003, p.14-16) Ecological Model of Physical Activity (EMPA), the influences are categorized as intrapersonal, interpersonal, community, public policy, and physical environment (Fleury & Lee, 2006; Gyuresik et al., 2006; Gordon-Larsen et al., 2006; Reed et al., 2006; Reed et al., 2008). For example, at the interpersonal level, an individual's family or peers can influence their physical activity participation, as can the climate and safety of the local community at an environmental level (Gorely, 2005) (Rowland, 1998). Evidence also documents the relationship between self-efficacy, perceived benefits and enjoyment of activity at the interpersonal level (Sallis & Owen, 1999). The EMPA is potentially useful in identifying the ecological determinants and correlates of physical activity in related research and programme implementing.

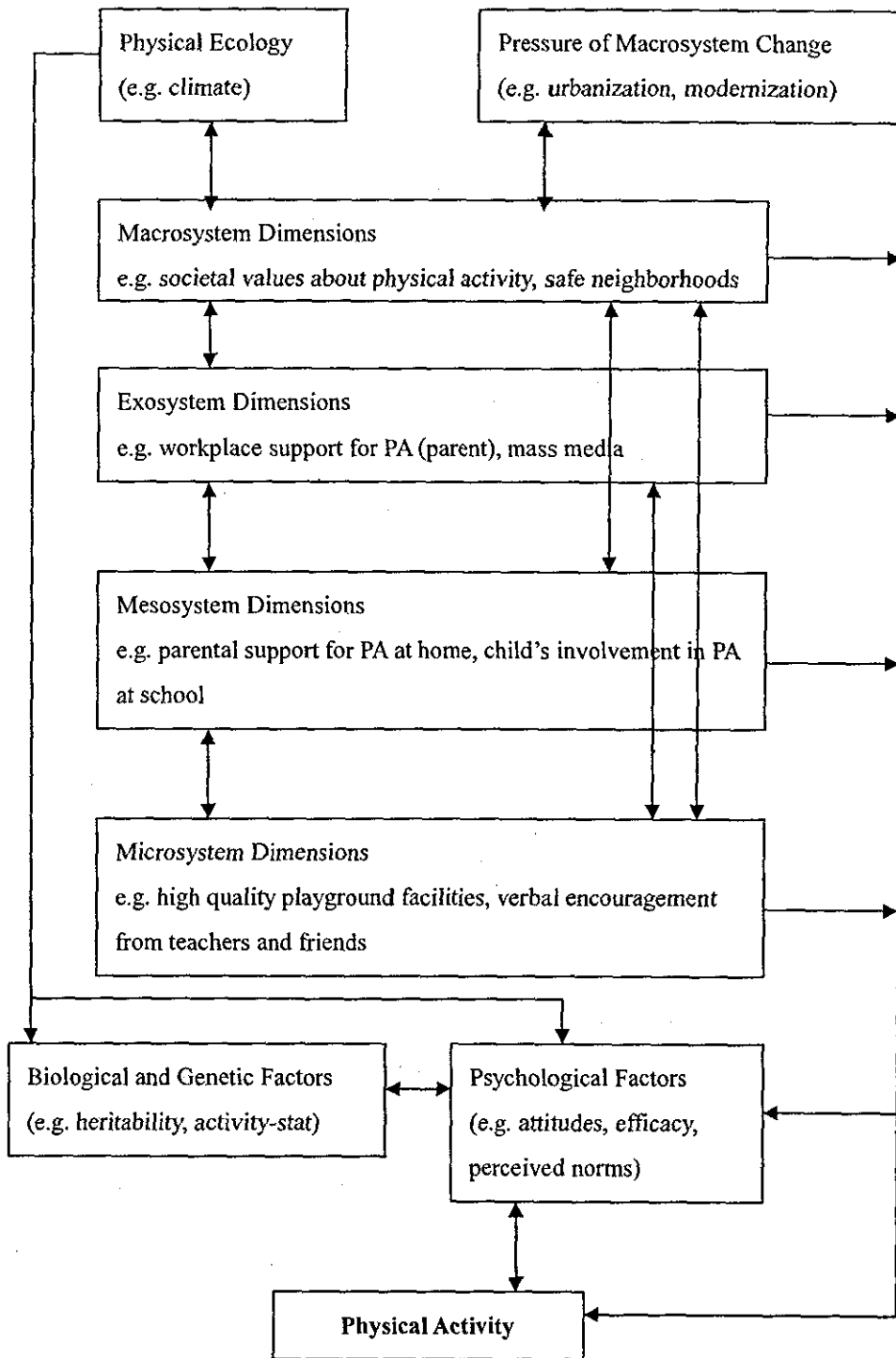


Fig 2.8 The Ecological Model of Physical Activity (EMPA) (Spence & Lee, 2003)

### 2.9.3.1 The Application of the Ecological Model to the School Context

Education plays a powerful and multifaceted role in raising awareness and in empowering and supporting individual choice (Tones & Tilford, 1994). Schools have the potential to promote young people's physical activity, and help them to develop

knowledge, understanding, and positive attitudes towards physical activity (Department of Health, 2004b). When promoting physical activity within the school context, teachers can work within an ecological framework and explore with pupils the range of influences on their physical activity (e.g. peers, family, home, curriculum, and school environment). Teachers and pupils can then work together to discuss the barriers they face and possible strategies to overcome these within and beyond the curriculum and school (Cale & Harris, 2009b).

The Healthy School and Active School are two approaches that draw on aspects of the ecological model and which involve the whole school in the promotion of pupils' health and physical activity and they acknowledge the influence of the multiple influences on young people's physical activity behaviour. They are committed to promoting health and physical activity to all members of the school community, both inside and outside of school, through the provision of a range of relevant opportunities in an appropriate environment.

The Healthy School aims to achieve healthy lifestyles for the entire school population (pupils, staff, governors, parents) by developing supportive environments conducive to the promotion of health (Cale & Harris, 2007). A Healthy School would be expected to make explicit its commitment to health by highlighting through its curricular, extra-curricular and organizational practices those aspects of learning which promote good health (Cale, 1997; Harris, 2000). The Healthy School has four themes ([www.healthyschools.gov.uk](http://www.healthyschools.gov.uk)) relating to both the curriculum and the emotional and physical learning environment in school. Although each theme covers a different area, the intention is that they are all delivered holistically so the basic requirements are the same. The four themes and their contribution to health are outlined below:

(1) Personal, Social and Health Education (PSHE): including Sex and Relationship



Education (SRE) and Drug Education (including alcohol, tobacco and volatile substance abuse). PSHE contributes significantly to five outcomes for children and young people: being healthy, staying safe, enjoying and achieving, making a positive contribution and achieving economic wellbeing. PSHE provides children and young people with the knowledge, understanding, skills and attitudes to make informed decisions about their lives.

- (2) **Healthy Eating:** contributing significantly to the being healthy outcome for children and young people. Children and young people have the confidence, skills, knowledge and understanding to make healthy food choices. Healthy and nutritious food and drink is available across the school day.
- (3) **Physical Activity:** contributing significantly to the being healthy outcome for children. Children are provided with a range of opportunities to be physically active. They understand how physical activity can help them to be healthier, and how physical activity can improve and be a part of their every day life.
- (4) **Emotional Health and Wellbeing:** The promotion of positive emotional health and wellbeing helps children and young people to understand and express their feelings, build their confidence and emotional resilience, and therefore their capacity to learn ([www.healthyschools.gov.uk](http://www.healthyschools.gov.uk)).

According to Fox (1996), an Active School is aware of the need to promote physical activity in all children and will constantly be developing strategies that will provide children with activity opportunities and increase their desire and knowledge-base to sustain active lifestyles. An Active School will maximize opportunities for children to be active by exploring all opportunities and avenues to promote physical activity (Cale, 1997).

The British Heart Foundation summarises the key aims of the Active School as

follows:

- (1) Adopting a whole-school approach to the promotion of physical activity.
- (2) Providing a supportive environment conducive to the promotion of physical activity.
- (3) Encouraging more pupils to be more active inside and outside of school
- (4) Providing pupils with positive physical activity experiences
- (5) Catering for the needs of every child.
- (6) Encouraging and promoting links with the community ([www.bhf.org.uk](http://www.bhf.org.uk)).

Fox and Harris (2003, p.197) summarize that a whole-school approach to physical activity promotion, such as the Active Schools, needs to incorporate the following:

1. The development of school policies that promote lifelong physical activity.
2. The provision of social and physical environments at school and in the local community that encourage and enable safe and enjoyable physical activity.
3. Frequent access to high quality, adequately resourced PE designed to promote physical activity and delivered by appropriately trained and supported staff.
4. The promotion of classroom health education that complements physical education.
5. The expansion of inclusive extra-curricular programmes that feature a selection of competitive and non-competitive, structured and unstructured, team and individual activities that meet the needs and interests of young people with a wide range of abilities.
6. Access to community physical activity programmes that meet the needs and interests of all young people.
7. Training for individuals who can play a role in promoting physical activity in

young people to help them provide developmentally appropriate, safe and enjoyable activity experiences.

8. Parental education and involvement to support school and community programmes that directly support their children's physical activity.

#### **2.9.4 Summary**

A range of approaches to health education and models of health and activity promotion have been examined to better understand the context within which schools help young people to adopt healthy, active lifestyles. They represent different ways of conceptualizing the differing structures, working arrangements and priorities within health and physical activity promotion. The models encompass different assumptions regarding the nature of health, social tendencies, environment and people's attitude to change. The intervention methods, the skills required by educators and the standard means of evaluating health will therefore all be different. They provide a stimulus to health promoters to examine health education and health promotion, and to re-examine their practices and underlying assumptions. In practice, health promoters and teachers are likely to use ideas and ways of working drawn from a combination of models to assist in the monitoring of young people's health, physical activity and fitness within schools. At the same time, these approaches and models provide a structural framework for proposing recommendations to monitor pupils' health, physical activity and fitness within the school PE curriculum.

### **2.10 Recent Evolutions and Innovations within School PE in England**

#### **2.10.1 Introduction**

In recent decades, numerous changes have taken place within the physical education

curriculum, some of which can be considered revolutionary and categorized as 'innovations'. One example is the health-related exercise (HRE) movement (Harris, 2000) which is relevant to this study.

Innovation was defined by Nicholls (1983, p.4) as 'an idea, object, or practice perceived as new by an individual or individuals'. 'Real change' cannot be said to have occurred unless accompanied by ideological transformations at the deeper levels (Sparkes, 1989). Studies focusing on the physical education curriculum in England have confirmed that the actual content of the secondary school curriculum has not changed as radically as many would like to believe (Sparkes, 1990). Furthermore, there has been limited transformation of teaching style (Sparkes, 1990). Teachers, like all individuals, have their personal views and beliefs and it requires time and education for them to make significant paradigm shifts.

According to Sparkes, ideological transformations need to occur in order to stimulate rudimentary changes (Sparkes, 1990). Sparkes (1989) has identified three levels of change (Figure 2.8) and states that unless there is significant movement at all three levels, there is 'superficial' rather than 'real' change. Fullan (1986), however, stated that it is not easy for people to change their behaviour and ways of thinking significantly, even if they are willing. It is stressful to challenge our own and others' ideologies because it can undermine our self-concept, fracture our own professional identities, question our daily work, and make our routines highly problematic. Indeed, as innovation and change are additional sources of stress, teachers tend to adjust to change by changing as little as possible and the new innovation is often conveyed together with the 'baggage of traditional methodologies' (Sparkes, 1990, p.3). Kirk (1988, p.82) considers that 'It is possible to present an innovation that embodies some new ideas without this ever bringing about any genuine change in what people think and do'. If Kirk's (1988) view has merit, studying and exploring the notion of

'innovation without change' can help to understand the effectiveness or otherwise of authoritative changes in schools and the evolution of physical educators in the process. Indeed, the evidence suggests strongly that, despite numerous surface changes in the organisation of schools, there has been little deep change within them (Evans et al., 1987; Kirk, 1988).

Making changes may not be easy. 'Real change' is defined as fundamentally changing values, attitudes and beliefs which result in deep, structural and lasting change rather than one of a superficial nature (Capel, 2000a). Curriculum change is difficult, particularly when many groups such as agencies, teachers, and governors, have interests and influential power in the curriculum. Evans (1985, p.147) has argued that, 'despite the hustle and bustle of curricular activity which on the surface suggests that substantial educational innovation is afoot, stratification, social division and inequality of education opportunity stand largely unscathed'.

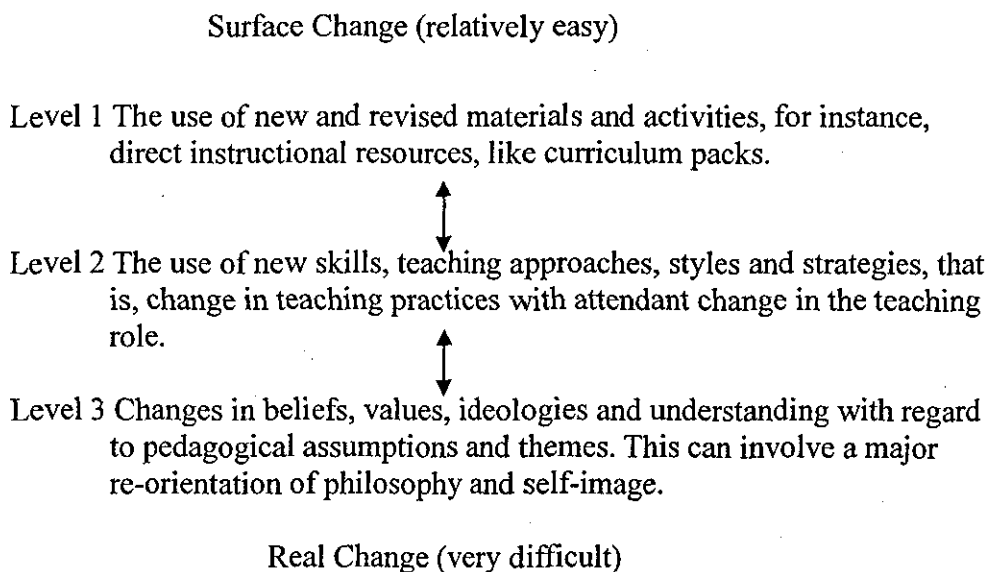


Figure 2.8 Levels of Change (Sparkes, 1989)

## **2.10.2 Innovation and Change within the Physical Education Curriculum**

Changes in the physical education curriculum over the last century have been influenced by changes in society over time. As society has changed, the priorities for physical education have also changed. This is the result of complex interaction between social, technological, economical, and political factors. In England, the influence of the economy on education, the importance of sport as part of the political agenda, and the concern for the health of the nation have all affected the PE curriculum in recent years (Capel, 2000b). Changes may be required in teaching practices in order for teachers to stay in 'sync' with curriculum developments. Changes may also be required in order to co-ordinate with other schools. Change should not be made for the sake of change, or to respond to the pressures from various advocating groups. If PE teachers have clear goals and objectives, they can be influential regarding the changes, priorities and directions of the PE curriculum (Capel, 2000b).

Games have long been a major part of the physical education curriculum in many schools (Penney & Evans, 1999). Green (2002) and Penney & Evans (1999) have observed that both teachers and government appear to focus on sports, and particularly competitive team games as the primary focus of PE and the vehicle for the promotion of healthy lifestyles (Fairclough et al., 2002). A comparison of the 1992 and 1995 versions of the NCPE shows an increased emphasis on team games in the latter, particularly at Key Stages 3 and 4. In the 1992 version of the NCPE (DES/WO, 1992), there was a clear bias towards games, and in the 1995 version of the NCPE (Department of Education and the Welsh Office (DfE/WO), 1995), the emphasis given to different areas of activity was not equal; 'games' was again enshrined as the dominant area (Penney & Evans, 1999). In the 2000 version of the

NCPE (Department of Education and Employment and the Qualifications and Curriculum Authority (DfEE/QCA), 1999b), the balance was redressed to some extent and it is notable that there is no longer a requirement for games to be compulsory for all pupils at Key Stage 4. Fairclough and Stratton's (1997) review of PE curricula in secondary schools revealed that traditional games such as football, netball, basketball, hockey, rugby and cricket dominated the curriculum through years 7 to 11 (ages 11-16) and that many schools did not teach dance and gymnastics at Key Stage 4. Furthermore, only one third of schools delivered courses with a focus on HRE each term. They concluded from their review that the physical education curriculum in many schools was still predominantly based around games (Fairclough & Stratton, 1997). Lockwood (2000) considers that, although it may not be necessary to allocate an equal share of curriculum time to each area of activity, it is necessary to consider whether the right balance is achieved across various areas of activities in the curriculum, because this will help to ensure that students' perceived competence and enjoyment in physical education are optimized.

### **2.10.3 Health-Related Exercise (HRE)**

Maintaining health through physical education is not a new concept. Over the years, there has been a shift in focus from skill development towards enjoyable physical activity for health benefits (Harris, 2000). Different activities suit different children and result in different health benefits. Physical education was driven by this objective at the beginning of the twentieth century (Sleap, 1990). Fox (1991) considers that providing a broad programme including competitive sports, dance, outdoor pursuits and health-related exercise will help youngsters to find a compatible activity and increase the possibility of an active lifestyle. The relationship between physical education and health has long been an area of debate (Almond & Harris, 1997).

Nonetheless, the potential of physical education contributing to health-enhancing behaviour is widely acknowledged (Capel, 2000b). It has been stressed how valuable the promotion of health in the physical education curriculum is, and how no other subjects have similar effects - specifically in the physical perspective (Whitehead, 2000).

In the 1980s, health became the key objective of physical education as health-related fitness developed significantly. Since then, many PE teachers have become interested in promoting health-related physical activity in schools in the UK (Brewer et al., 1988). Consequently, a focus on health-related exercise was included as a statutory component of the NCPE (Department of Education and Science and the Welsh Office (DES/WO), 1992) and a component of the cross-curricular theme of health education (NCC, 1990).

The HEA (1998) defined HRE as: physical activity associated with health enhancement and disease prevention. HRE is the term often adopted within the NCPE for work associated with health and physical fitness. The teaching of HRE typically includes the teaching of knowledge, understanding, competence and motor skills, behavioural skills, and the creation of positive attitudes and confidence for life-long participation in physical activity (Harris, 2000). However, despite its place and development within the NCPE, concerns were expressed over its implementation. For example, following a national survey of 1000 secondary schools, Harris (1997) revealed that the systematic expression of HRE was confused, limited and inconsistent, and that there was insufficient guidance for teachers. Harris (1997) concluded that the goal of utilising PE to promote health remained neither universally accepted nor well understood.

In 1997, a Health-Related Exercise Working Group was established in England, which comprised representatives from schools, higher education, the advisory



services and key sport, health and PE organisations. The main purpose of this group was to produce HRE practice guidelines for teachers in the form of a curriculum resource. The Guidance Material was published in 2000 (Harris, 2000) and provided an interpretation of HRE requirements for teachers in the form of specific learning outcomes. The HRE Guidance Material indicated significant progress and scope for future improvements in the field.

Within the curriculum, Harris (2000) proposed that pupils' health-related learning could be monitored in the following ways:

1. Responses to focused questions (pupil-teacher or pupil-pupil) and practical tasks.
2. Teachers' observation of pupils' performance in practical tasks.
3. Pupils taking more responsibility for their actions within and outside lessons.
4. Pupils attending, participating and demonstrating commitment in physical education lessons.
5. Pupils participating and demonstrating commitment in extra-curricular activities.
6. Pupils participating in physical activity outside of school.
7. Pupils' entries in activity diaries (e.g., keeping a record for a number of weeks of all the activity, sport, dance exercises performed at school, home and in the local area).
8. The proportion of physical education lessons missed or not participated in by pupils.
9. The degree of interest shown and effort put into physical education lessons by pupils.

The emphasis of HRE is on promoting lifetime health rather than short term fitness gains or physical skill development. Its intention is to shift away from programmes that are fixated on sports performance only, to programmes which effectively promote lifetime sport and exercise involvement. However, many health-related PE

programmes focus predominantly on the development of children's physical fitness and pupils are assessed on their performance in selected fitness tests (Harris & Cale, 1997). HRE should encompass much more than simply monitoring fitness but many teachers seem to have defined the area narrowly. It could be argued therefore, that HRE is an example of an 'innovation without change'.

#### **2.10.4 Summary**

Innovations and changes within the physical education curriculum have been reviewed in this section. The review suggests that the physical education curriculum in England has not changed greatly over the years in terms of its fundamental paradigm. Team games continue to dominate the physical education curriculum in the twenty-first century, and fitness testing still seems to be a central focus of many HRE programmes. It is clear that real change may not be easy. Teachers' values, attitudes and beliefs play an important role with respect to true curriculum change, requiring a paradigm shift. Thus, government's formal policy support, formal guidance and sufficient resource provision and continued in-service training will help teachers to verify the purpose and the importance of the change and innovation. Further, integrating the new approach into the original curriculum gradually, step by step, could help to remove teachers' stress and constraints to facing the new challenge. Reviewing this literature provides relevant contextual information to be considered when proposing recommendations associated with monitoring pupils' health, physical activity and fitness within the school PE curriculum.

#### **2.11 Summary of Literature Review**

The purpose of monitoring is to promote knowledge and understanding of health,

physical activity and fitness, and to improve pupils' current and future health, fitness and well-being. A range of methods of monitoring young people's health, physical activity and fitness have been outlined. However, monitoring itself encompasses multiple practical difficulties and minimal attention has been paid to monitoring within the school curriculum.

Each monitoring method has advantages and disadvantages. The more precise and accurate methods require expensive equipment or involve specialists in operating equipment and are, therefore, not suitable for large samples. The simple and convenient methods are quick and inexpensive and can be carried out by pupils themselves, but are relatively unsophisticated. Furthermore, monitoring within the school curriculum has to consider many issues, for example, its appropriateness, the validity and reliability of the tests or measures, the pupils' cognitive abilities, the constraints of the physical resources, and the possible limited knowledge and understanding of differing philosophies, processes and procedures associated with monitoring.

Approaches and models of PE and health promotion have been reviewed and critiqued to establish the range of contexts within which monitoring health, physical activity and fitness occur. Two main types of approaches have been categorized: the 'expert-led', 'top-down' or 'teacher-centered' type, and the 'bottom-up', 'learner-centered' type. Approaches can be selected by teachers to help improve pupils' learning in relation to health, physical activity and fitness, and to help them develop competence and confidence in making their own decisions, identifying their own health concerns, and increasing control over their own lives.

Furthermore, innovations and changes within the physical education curriculum in England have been reviewed. HRE is a relatively recent innovation which aims to help improve pupils' knowledge and understanding of the relationship between health

and PE and increase their involvement in physical activity. Yet, evidence suggests that the interpretation of the area is narrow due to teachers' lack of knowledge and understanding of the area and insufficient guidance causing undue reliance on fitness testing as a means of promoting physical activity and health. Skill development tends to dominate the focus of the physical education curriculum in England (Fairclough et al., 2002; Sport England, 2001). HRE guidance material (Harris, 2000) has provided support and guidelines for teachers and consequently some improvements in HRE may be anticipated in the future.

In terms of promoting pupils' health, physical activity and fitness within the school curriculum, all these goals are normally delivered in less than two hours per week. It seems that PE teachers could do much by re-appraising their teaching philosophy and teaching style, thereby increasing pupils' knowledge and understanding of health issues and employing appropriate monitoring methods. This would help teachers to enhance pupils' lifelong participation in activity which is one of the main aims of physical education (Armstrong & McManus, 1994; Cale, 1998; Harris, 2000; MMWR, 1997; Stratton et al., 2008).

This review is drawn on later within this thesis to critique approaches and methods of monitoring health, physical activity and fitness within the secondary school PE curriculum in England.

## **2.12 Expectations**

From the literature review, the researcher expected to find that:

1. Fitness testing is commonplace within the PE curriculum in England.
2. Most HoPEs consider that fitness testing promotes healthy lifestyles and physical activity.
3. Most HoPEs believe that pupils' physical activity levels can be judged from their

fitness levels.

4. Some HoPEs use fitness testing data inappropriately (e.g. to grade pupils, evaluate teacher competence).
5. Some pupils' responses towards fitness testing are negative.
6. Few HoPEs claim to develop pupils' knowledge and understanding through health, physical activity and fitness monitoring.
7. The most common teaching model employed in health, physical activity and fitness monitoring is the teacher-center model.

## Chapter 3: Research Methodology

### **3.1 Introduction**

The purpose of this chapter is to justify and describe the methods adopted within the study to gather the data which were then used as a basis for inference, interpretation, explanation and prediction (Cohen et al., 2001) with respect to monitoring health, physical activity and fitness within the school curriculum. The chapter is presented in five main sections: (1) survey procedures, (2) pilot study: local survey, (3) main study: national survey, (4) interviews, and (5) research ethics.

As stated in the introductory chapter, the aims of the study were to determine the purpose and prevalence of monitoring children's health, activity and fitness within the secondary school curriculum in England, to explore factors influencing HoPEs' views of and approaches to monitoring, and to propose recommendations for monitoring health, physical activity and fitness within the secondary school PE curriculum in England which may be applicable to the Taiwanese context. Having established these research aims, it was necessary to identify the issues to explore within the research process and the appropriate methods of doing so.

In order to address the stated aims, the research design involved the integration of quantitative and qualitative methods. Data triangulation (Marshall & Rossman, 1995) was employed using a variety of data sources including questionnaire survey and interview data gathered from the same sample to overcome the weaknesses of any single method, to reduce the impact of potential biases that can exist in the study, and to provide mutual confirmation that the results are valid (Bryman, 1988; Marshall & Rossman, 1995; Robson, 1993).

It was critical in conducting the research that the selected methods measured the concepts in question and did so in a consistent manner. The literature review informed

the process through identification of specific issues to be explored during the first phase of the research process. The second phase of the research design included pilot testing, which is an important means of assessing the validity and reliability of the research method (Gratton & Jones, 2004). The pilot informed the third stage, which was the main study involving a national survey of selected secondary schools. Following analysis of the survey data, the findings were used to inform the fourth stage, which involved selecting and interviewing a sample of secondary school HoPEs. Each of these stages of the research process will be described in detail in the following sections of this chapter.

## **3.2 Survey Procedures**

### **3.2.1 Questionnaire**

Survey research is characterized by gathering a structured or systematic set of data, the analysis of which is based on a comparison of cases (Gratton & Jones, 2004). The questionnaire is a type of paper-and-pencil survey used in descriptive research in which information is obtained by asking participants to respond to questions rather than by observing their behaviour (Thomas et al., 2005). The collection of data using this method is considered to be an appropriate means of seeking the current views and practices of a specified population (Cohen et al., 2001; Thomas et al., 2005). The advantages of using a questionnaire are that: it tends to be reliable; it is relatively economical in terms of time and money; and it may be mailed (Cohen et al., 2001). However, questionnaires also have the following disadvantages: potential problems over complex questions; no control over who does and does not complete the questionnaire; no opportunity to probe; and potentially low response rates (Gratton & Jones, 2004).

In order to establish baseline data on the monitoring of pupils' health, activity

and fitness within the PE curriculum in secondary schools in England, it was decided to utilise questionnaires to obtain information from as wide a geographical area as possible within the time and funding restrictions. The survey was designed to gather data on Heads of Physical Educations' (HoPEs') views, approaches and practices relating to monitoring pupils' health, activity and fitness in the school PE curriculum. HoPEs were selected as they are responsible for the design and delivery of the PE curriculum in their schools.

The objectives of the study as well as issues arising from the literature review and meetings with university supervisors informed the design of the questionnaire. In terms of content, questions that focused on contextual data such as the size and gender-mix of schools were included in order to permit comparison of information between different types of secondary schools.

Following this, the survey specifically aimed to gather data that would describe the prevalence and purpose of monitoring pupils' health, activity and fitness in schools and to explore the factors influencing this. The final version comprised five sections, including: general information; monitoring young people's health; monitoring young people's activity; monitoring young people's fitness; and monitoring health, activity and fitness within the school curriculum.

The questionnaire was designed following guidance provided from Vaus (1993), Thomas and Nelson (2001), Hudson and Miller (1997), Cohen and colleagues (2001) and Gratton and Jones (2004). Short rather than long questions were used, clear instructions about the form of the responses were given, and easier questions were placed at the beginning of the questionnaire (Frazer & Lawley, 2000; Gratton & Jones, 2004). Furthermore, items were avoided that used overly technical language or jargon, had two or more separate ideas in the same question, included negative items, or that led respondents to answer in a certain way (Frazer & Lawley, 2000; Gratton & Jones,



2004). Having designed the questionnaire, attention was paid to its appearance and format in an attempt to increase the response rate (Cohen et al., 2001; Gratton & Jones, 2004).

A covering letter was prepared to accompany the questionnaire, which explained the purpose of the survey in a succinct manner. In this way, it was hoped that the respondent would be more likely to become interested in the questionnaire and to co-operate. The name and address of the investigator, clear and complete instructions for answering the questions, and assurance of confidentiality and anonymity were also provided to try to further enhance the response rate.

### **3.2.2 Validity and Reliability of the Questionnaire**

An important issue in questionnaire design is whether the instrument is valid and reliable (Frazer & Lawley, 2000). Issues relating to validity and reliability were considered throughout the questionnaire design process and are also referred to in later sections of this chapter. Validity refers to the degree to which a test or instrument measures what it purports to measure (Cohen et al., 2001; Thomas et al., 2005). Thus, validity refers to the soundness of the interpretation of a test, the most important consideration in measurement. Validity is generally addressed by adopting a good existing criterion or well-accepted definition, or well-established theory using the concept (Thomas et al., 2005). In quantitative research, validity can be improved through careful sampling, suitable instrumentation and appropriate statistical treatment of the data (Cohen et al., 2001; Frazer & Lawley, 2000).

Reliability is a synonym for consistency and replication over time, over instruments and over groups of respondents concerned with accuracy and precision (Cohen et al., 2001; Frazer & Lawley, 2000; Gratton & Jones, 2004). A reliable research method must demonstrate that similar results could be achieved if it were to

be carried out or repeated on similar groups of subjects in a similar context (Cohen et al., 2001; Frazer & Lawley, 2000; Gratton & Jones, 2004).

### **3.3 Pilot Questionnaire Design**

A pilot study is recommended for any type of research and serves a number of purposes, including: to check that the sequence and wording of the questions are clear and logical to respondents, to allow a 'dry run' at analysing the data collected (Gratton & Jones, 2004; Thomas et al., 2005), and to increase the reliability, validity and practicability of the questionnaire (Cohen et al., 2001).

In order to enhance the validity and reliability of the questionnaire employed within this study, a pilot questionnaire was implemented and content (expert) validity was employed. The questionnaire was distributed to numerous professional colleagues who were PE inspectors or PE teachers in secondary schools in England and their comments were requested. Their feedback on the questionnaire design and presentation was then used to modify and improve the questionnaire before distributing it to a local sample for piloting (Appendix A: Pilot Questionnaire).

#### **3.3.1 Pilot Sample**

The sample for the pilot study was a convenience sample comprising the HoPEs within the forty secondary schools associated with the Post-Graduate Certificate in Education (PGCE) course at Loughborough University. The schools were based in the East Midlands region of England, specifically in the counties of Leicestershire, Derbyshire, Staffordshire and Nottinghamshire. This use of non-probability sampling is considered to be acceptable where the intention is to pilot a survey questionnaire as a prelude to a main study (Cohen et al., 2001; Thomas et al., 2005).

### **3.3.2 Pilot Questionnaire Administration**

Forty questionnaires plus accompanying letters (Appendix A: Letter accompanying pilot questionnaire) were posted to the HoPEs on 1<sup>st</sup> December 2003. Each letter included a stamped addressed envelope in order to encourage a higher response rate (Thomas et al., 2005). The questionnaires were anonymous (although coded for follow-up purposes) to encourage the participants to develop their own ideas and concepts drawn from their experiences (Cohen et al., 2001). The return date was the 18<sup>th</sup> December 2003 which allowed approximately two weeks for completion. By this date, sixteen questionnaires had been returned (a response rate of 40.0 per cent). A follow-up letter and a second copy of the questionnaire were sent directly to the HoPEs on 2<sup>nd</sup> January 2004, to be returned by 13<sup>th</sup> January 2004. The second mailing to the non-respondents led to a total response rate of 50.0 per cent. This was considered an acceptable response rate as a well-planned postal survey should be able to achieve a 40.0 per cent or more response rate (Cohen et al., 2001).

### **3.3.3 Pilot Questionnaire Data Analysis**

The pilot allowed for a 'dry run' at analysing the data collected from the questionnaires and provided a useful 'practice' for the main survey data analysis (Gratton & Jones, 2004). Following the pilot, the questionnaire was evaluated with respect to the overall response rate, response rate per question, and the degree of completion (Table 3.1). As each questionnaire was returned, it was checked by the author for completeness, accuracy and uniformity and any comments made by the HoPEs were noted (see 3.4.1 for the response to the pilot).

The data were processed using the Statistical Package for Social Scientists (SPSS) for Windows 10.0 (Ntoumanis, 2001). The statistical methods used included descriptive statistics to provide information on the percentage of different types of schools, the

age ranges of pupils, the prevalence of monitoring pupils' health, physical activity or fitness within the school curriculum, the methods the HoPEs employed for monitoring, and their attitudes and views towards specific statements.

Table 3.1 Responses to the Pilot Questionnaire Survey

Question	Response Rate %
Questionnaires in total	50
<b>Response rate per question</b>	
<b>Section A: General Information about the School</b>	
1. Type of school	100
2. Age range	100
3. Gender	100
<b>Section B: Monitoring Young People's Health within the School Curriculum</b>	
1. Does your school or department monitor pupils' health?	100
(a) Why is pupils' health monitored? (open ended)	60
(b) How is the information collected utilised? (open ended)	60
(c) In what area(s) of the curriculum is pupils' health monitored? (open ended)	65
(d) What aspects of pupils' health are monitored?	65
(e) What resources or equipment are used to monitor pupils' health?	60
(f) How often is pupils' health monitored?	60
(g) When is pupils' health typically monitored?	60
2. Do you think that your school or department should monitor pupils' health? Please give reasons for your answer (open ended)	86
<b>Section C: Monitoring Young People's Activity within the School Curriculum</b>	
1. Does your school or department monitor pupils' physical activity?	100
(a) Why is pupils' physical activity monitored? (open ended)	85
(b) How is the information collected utilised? (open ended)	65
(c) In what area(s) of the curriculum is pupils' physical activity monitored? (open ended)	85
(d) In which of the following ways is pupils' physical activity monitored?	85
(e) How often is pupils' health monitored?	85
(f) When is pupils' physical activity typically monitored?	85
2. Do you think that your school or department should monitor pupils' physical activity? Please give reasons for your answer (open ended)	90
<b>Section D: Monitoring Young People's Fitness within the School Curriculum</b>	
1. Does your school or department monitor pupils' fitness?	100
(a) Why is pupils' fitness monitored? (open ended)	100
(b) How is the information collected utilised? (open ended)	90

(c) In what area(s) of the curriculum is pupils' fitness monitored? (open ended)	95
(d) Which of the following ways is pupils' fitness monitored?	100
(e) Which of the following methods or tests are used to monitor pupils' fitness?	100
(f) How often is pupils' fitness monitored?	100
(g) When is pupils' health typically monitored?	100
2. Do you think that your school or department should monitor pupils' fitness? Please give reasons for your answer (open ended)	95
<b>Section E: Monitoring Health, Physical Activity and Fitness within the School Curriculum</b>	
1. Is health, activity and/or fitness monitoring a compulsory component of the PE curriculum for any of the following year groups?	100
If NO, do you feel health, activity and/or fitness monitoring should be a compulsory component of the PE curriculum for any year groups? Please give reasons for your answer (open ended)	60
2. If your school or department monitors pupils' health, activity and fitness, which, if any, is given most emphasis?	100
3. If your school or department monitors only 1 or 2 of the above, please explain why this is (open ended)	50
4. Generally how do your pupils respond to health, activity and/or fitness monitoring within the curriculum?	100
5. Is any of the health, activity or fitness information reported to parents either verbally or in a written report?	100
<b>Section F: Personal Information</b>	
1. Do staff use any texts to assist in monitoring health, physical activity and fitness? If yes, please provide brief details of the texts. (open ended)	65
2. Are you male or female?	100
3. How many years experience do you have of teaching Physical Education?	100
4 How many years experience do you have as a Head of Physical Education?	100
<b>HoPEs' Attitudes and Views towards Statements</b>	
a. Monitoring young people's health should be an important component of any PE programme.	100
b. Monitoring young people's activity is a waste of time.	100
c. More emphasis should be placed on monitoring young people's fitness within the PE curriculum.	100
d. It is desirable to monitor young people's health within the school curriculum.	100
e. Monitoring young people's activity is problematic within the school curriculum.	100
f. Too much time is spent on monitoring young people's fitness within the school curriculum.	100

g. Fitness testing merely distinguishes the mature and motivated pupils from the less mature and de-motivated.	100
h. School has a responsibility to monitor pupils' health, activity and fitness.	100
i. The way in which monitoring is carried out influences young people's attitudes towards their health, activity and fitness	100
j. Fitness testing can be effective in promoting activity and fitness	100
k. Promoting and monitoring activity is more important than promoting and monitoring fitness within the curriculum	100
l. It is more appropriate to monitor health-related fitness than skill-related fitness.	100

#### **HoPE's Comments and Suggestions about the Questionnaire**

1. Some HoPEs commented on the long length of the questionnaire.
2. The concepts relating to health and fitness were confusing. Need clear definitions of health, physical activity and fitness.
3. State middle school is replaced by state high school.
4. Grant maintained secondary school is replaced by foundation secondary school.
5. They monitor pupils' health, physical activity or fitness at various times.
6. They required add 'boy, girl, mixed' options in the question of "Pupils' responses to health, activity and fitness monitoring within the curriculum".
7. Some stated that the questions relating to boys' and girls' PE curricula should be separated out.

### **3.4 Main Study**

#### **3.4.1 Main Survey Questionnaire Revisions**

The responses from the pilot questionnaire (see Table 3.1) indicated a need to provide clear definitions of health, activity and fitness, to clarify the wording of some questions and to take account of different curricula for boys and girls in some schools.

As a consequence, the following amendments were made to the questionnaire: (a) a statement was included at the beginning to inform respondents that the questionnaire assumed that the curriculum for girls and boys in their school was similar, but if this was not the case and they wished to complete two separate questionnaires for girls and boys, then they should feel free to photocopy the questionnaire or contact the researcher for another copy; (b) a question was added to indicate whether the questionnaire was related to the boys', girls', or boys' and girls' curriculum; (c)

guidance was added to inform respondents that the questionnaire comprised five sections - A: General Information, B: Monitoring Young People's **Health**, C: Monitoring Young People's **Activity**, D: Monitoring Young People's **Fitness** and E: Monitoring Health, Activity and Fitness within the School Curriculum; (d) definitions were added in sections B, C and D to help respondents clarify the difference between health, activity and fitness. For example the following definition of health was provided: 'Health is a positive state of physical, mental and social well-being. It is much more than simply absence of illness or disease. It is a resource for everyday life'; (e) an item 'Various times of the year' was included as an additional response to the question: 'When is pupils' health, activity or fitness typically monitored?' The author's supervisors advised upon both the additional and amended questions and approved the final version (Appendix B: Main Survey Questionnaire).

### **3.4.2 Main Survey Sample**

Following the pilot, the secondary schools that would comprise the main survey sample were selected. Schools from the pilot study were excluded as they had already contributed to the research. The sample for the national survey comprised 307 schools considered to be representative of secondary schools in England. A proportionate, stratified sampling procedure was adopted, with the variables used to stratify the sample being the type of school and the size of the Local Education Authority (LEA). According to the information provided by the Education Directory (The School Government Publishing Company Limited, 2004), there were 149 LEAs with 3769 state secondary schools in England. These included 228 specialist sports colleges\*, with the rate of specialist sport colleges to state secondary schools being 228/3769, or 6 per cent. LEAs were categorized as (a) small: with 1 school, (b) medium: with 2-5 schools, (c) large: with 6-49 schools, or (d) very large: with more than 49 schools.



Based on these categories, there were 2 small, 13 medium, 128 large and 6 very large LEAs in England. The schools were randomly selected, with one school selected from each small and medium LEA, two schools from each large LEA and three schools from each very large LEA. In total, 289 state secondary schools were selected to be involved in the study, 6 per cent (18) of which were specialist sports colleges\*. The precise school names, addresses and allocated questionnaire numbers were recorded for follow-up purposes.

\* **Specialist Sports College:** A Specialist Sports College is a maintained secondary school which receives additional funding from the Department for Children, Families and Schools (DCFS) to raise standards in physical education and sport within its own school. Sports Colleges aim to raise standards of achievement in physical education and sport for all their students across the ability range leading to whole school improvement ([www.standards.dfes.gov.uk](http://www.standards.dfes.gov.uk)). They are regional focal points for promoting excellence in physical education and community sport, extending links between families of schools, sports bodies and communities, sharing resources, developing and spreading good practice, helping to provide a structure through which young people can progress to careers in sport and physical education. Sports Colleges aim to increase participation in physical education and sport for all pre and post 16 year olds and develop the potential of talented performers. Sports Colleges can promote a supportive environment for young people with sporting talent to fulfill their potential.

### **3.4.3 Main Survey Questionnaire Administration**

When administering a main survey questionnaire, it is important to carefully consider the best time for the initial mailing (Gratton & Jones, 2004; Thomas et al., 2005).

Holiday, vacations, and especially busy times of the year for respondents should clearly be avoided.

Three hundred and seven questionnaires plus accompanying letters (Appendix D) were prepared and sent to the headteachers and the HoPEs of the selected schools on 26<sup>th</sup> January 2004. As with the pilot study, and as recommended by Thomas et al., (2005), each letter included a stamped addressed envelope, and each questionnaire was coded for follow-up purposes. The specified return date was 13<sup>th</sup> February 2004, which allowed approximately three weeks for completion. By the official return date, 108 questionnaires had been returned, a response rate of 35.2 per cent. Of these, 103 were completed and five were returned not completed. It is recognised that a follow-up letter is nearly always needed in order to increase the response (Gratton & Jones, 2004; Thomas et al., 2005). A follow up questionnaire plus a letter (Appendix E) to the HoPEs were therefore sent on 16<sup>th</sup> February 2004 with returns requested by 27<sup>th</sup> February 2004. The second mailing to the non-respondents led to a total response rate of 38.4 per cent. This figure was close to the response rate that should be achievable from a well planned postal survey (Cohen et al., 2001).

#### **3.4.4 Main Survey Questionnaire Data Analysis**

As with the pilot study, the responses were evaluated in order to identify and eliminate any errors made by the respondents and checked for completeness, accuracy and uniformity. The data were then (1) coded: which included translating the responses received into numerical values to allow subsequent statistical analysis; and (2) entered: which involved inputting the numbers produced from step one into the SPSS for Windows software (Gratton & Jones, 2004). The data were then analysed using the Statistical Package for Social Scientists (SPSS) (Ntoumanis, 2001), and descriptive statistics and Chi-square analysis data were obtained. The descriptive

statistics were used to organise and summarise the numerical data, providing details of the response rate, the prevalence of monitoring, the percentage of each monitoring instrument employed, and the HoPEs' attitudes and views towards specific statements. The Chi-square analysis was employed to provide information on whether there were relationships between:

1. The HoPEs' gender and the implementation of health, physical activity or fitness monitoring;
2. The HoPEs' gender and their attitudes and views towards monitoring;
3. The HoPEs' teaching experience and the implementation of health, physical activity or fitness monitoring;
4. The HoPEs' teaching experience and their attitudes and views towards monitoring.

The hypotheses of the Chi-square analysis were as follows:

1. There is a significant relationship between the HoPEs' gender and the implementation of health, physical activity or fitness monitoring. The significance level is .05.
2. There is a significant relationship between the HoPEs' gender and their attitudes and views towards monitoring. The significance level is .05.
3. There is a significant relationship between the HoPEs' teaching experience and the implementation of health, physical activity or fitness monitoring. The significance level is .05.
4. There is a significant relationship between the HoPEs' teaching experience and their views and attitudes towards monitoring. The significance level is .05.

### **3.5 Interviews**

Interviews can provide data that are difficult or inappropriate to measure, and tend to explore questions of 'why' and 'how' (Gratton & Jones, 2004; Seidman, 2006). Thus, in order to obtain an in-depth explanation of 'why' and 'how' health, physical activity and fitness monitoring was (or was not) implemented within the school curriculum rather than simply 'what' and 'when', interviewing was considered to be an appropriate method to adopt.

The advantages of interviews include that they: (1) enable participants to talk about their own experiences or any areas of particular interest or importance in their own words, (2) can be more insightful than other methods, (3) allow unexpected data to emerge, (4) allow researchers to assess the participants' body language, facial expressions, tone of voice, (5) enable researchers to introduce themselves to the subject and establish trust and rapport, and (6) enable researchers to investigate target groups that may be less able to complete surveys (Gratton & Jones, 2004).

As well as strengths, interviewing does have a number of potential limitations that need to be considered: (1) it may be expensive in terms of time and travelling, and the sample may be small and unrepresentative of the wider population; (2) researchers may add bias as a result of their – often unconscious – verbal and non-verbal communications. It is possible that the interviewee thinks that they have to provide the 'right' answers, rather than their own views; (3) the interviewee may dominate and lead the interview in unwanted directions; (4) reliable and valid analysis of interview data may be difficult, especially where there may be ambiguity (see the following section for further details); (5) the quality of the data is dependent upon the responses of the interviewee; and (6) interviewees are subject to problems of recall, misperception and incorrect knowledge (Gratton & Jones, 2004).

### **3.5.1 Validity and Reliability of Interviews**

In qualitative research, the subjectivity of respondents, their opinions, attitudes and perspectives contribute to a degree of bias (Cohen et al., 2001). With respect to data collection, the personal involvement, intensity and the depth of individual responses secure a sufficient level of validity and reliability (Gratton & Jones, 2004; Seidman, 2006). The most practical way to achieve validity is to minimize the amount of bias in terms of the characteristics of the interviewers and respondents, and the substantive content of the questions (Cohen et al., 2001). These biases include: (1) the attitudes, opinions, and expectations of the interviewer; (2) a tendency for the interviewer to see the respondent in his/her own image; (3) a tendency for the interviewer to seek answers that support his/her preconceived notions; (4) misperceptions on the part of the interviewer of what the respondent is saying; and (5) misunderstanding on the part of the respondent of what is being asked (Cohen et al., 2001, p.121). Both interviewers and interviewees alike bring their experiential and biographical 'baggage' to the situation (Cohen et al., 2001; Mason, 1996).

These factors were taken into account in designing the interview schedule. For example, to enhance the validity of the interview schedule, the following guidance was heeded: (1) introduce the purpose and structure of the interview beforehand (for example, in the form of a letter); (2) group questions about the same concepts together, and try to avoid jumping backwards and forwards between topics; (3) begin with one or more 'easy' questions that will put the respondent at ease, and encourage them to begin talking comfortably; and (4) ensure that the questions are clearly worded, unambiguous and understandable to the interviewee - if the relevance is not apparent, or if the interviewee seems unclear, take time to explain the purpose of the questions (Gratton & Jones, 2004, p.144).

In this study, in order to improve the validity of the interviews, the subjects were made aware of the confidentiality of the interview; and the researcher utilised

clarification and elaboration probes (such as 'could you tell me more about that?', 'why is that?').

Reliability in qualitative research can be regarded as a fit between what data researchers record and what actually occurs in the natural setting (Gratton & Jones, 2004; Seidman, 2006). The reliability of interviews can be enhanced by: having a highly structured interview, with the same format, words and questions for different respondents (Seidman, 2006; Thomas et al., 2005); careful piloting of interview schedules; training of interviewers and inter-rater reliability in the coding of responses; and the extended use of closed questions (Thomas et al., 2005). Silverman (1993) also suggests that it is important for each interviewee to understand the question in the same way.

In addition, in order to improve the reliability of the interview, the following procedures were adopted: a standardised interview schedule; maintenance of a consistent interview environment; recording with the interviewees' permission; and transcribing the data within a short time following the interview.

As a non-native English researcher, the questions designed for the interview were discussed with and reviewed by the researcher's supervisors, and the interview process was practised with native English colleagues and the supervisors before the interviews were conducted. Following the interviews, the transcription texts from the recording tapes were re-checked by native English professionals to try to eliminate any potential misunderstanding or error. Furthermore, as mentioned earlier, data triangulation was employed. The interviewees provided information about their opinions and attitudes towards health, physical activity and fitness monitoring through the questionnaire survey and during the interviews, the researcher then confirmed their attitudes and views by asking appropriate questions.

### **3.5.2 The Interview Schedule**

Analysis of the responses to the Main Survey Questionnaire indicated the prevalence and purpose of monitoring pupils' health, activity and fitness within the secondary school curriculum in England and some of the factors influencing this. The interview schedule was designed to include questions aimed at obtaining more detailed information about monitoring, and in particular, about HoPEs' views of, and attitudes towards, it. In addition, it sought to ascertain the reasons why the HoPEs did or did not monitor pupils' health, activity and fitness, how they helped young people to modify their health/activity/fitness behaviour, and to explore any general issues or concerns they had in relation to monitoring. The researcher's supervisors commented upon both the additional and amended interview questions (Appendix C) and approved the interview schedule (Appendix E).

### **3.5.3 Interview Sample**

Following the main survey, schools were divided into three categories: (a) those which did not monitor pupils' health, activity or fitness (3.4 per cent), (b) those which monitored one or two of health, activity or fitness (67.8 per cent), and (c) those which monitored all three, health, activity and fitness (28.8 per cent). Forty of the schools that responded to the main survey questionnaire were selected to be involved in the interviewing process according to whether they were in category a, b, or c, and their geographic location. Forty letters were sent on 15<sup>th</sup> March 2004 to the headteachers (Appendix D) and the HoPEs of the schools concerned inviting the HoPEs to be involved in the interviews. An interview timetable was prepared taking into account the schools' geographical area and this was enclosed with a return slip with the letter. As with the pilot and main surveys, each letter included a stamped addressed envelope in order to encourage an acceptable response rate. If the HoPEs agreed to be

interviewed, they were asked to identify two suitable times on the return slip. The return date was set for 2<sup>nd</sup> April 2004, which allowed approximately three weeks for a response. By the official return date, 20 HoPEs had returned the letters (a response rate of 50.0 per cent). Of these, 18 indicated that they would like to be interviewed, whilst two declined to be interviewed stating that they were too busy.

### 3.5.4 Interview Arrangements

On the basis of the responses received, the interview dates were arranged and conducted in the following geographical locations: (1) London and South West England: 26<sup>th</sup> - 28<sup>th</sup> April, (2) South East England: 29<sup>th</sup> - 30<sup>th</sup> April, (3) Midlands: 3<sup>rd</sup> - 4<sup>th</sup> and 7<sup>th</sup> May, (4) North West England: 10<sup>th</sup> - 11<sup>th</sup> May, (5) North East England: 12<sup>th</sup> - 13<sup>th</sup> May 2004 (Appendix H). Although 18 HoPEs initially indicated that they were prepared to be interviewed, only 15 schools could be accommodated within the time available. Each interview took place in a suitably quiet room in the school building, lasted from thirty to fifty minutes, and was recorded with the consent of the interviewees, and later transcribed (Gratton & Jones, 2004; Thomas et al., 2005).

When conducting the interviews, Kvale (1996) sets out a range of conditions that need to be met for an effective interview, namely that the interviewer/interview should be:

- *knowledgeable* (of the subject matter so that an informed conversation can be held);
- *well structured* (making clear the purpose, conduct, completion of the interview);
- *clear* (in choice of language, in presentation of subject matter);
- *gentle* (enabling subjects to say what they want to say in its entirety and in their own time and way);
- *sensitive* (employing empathetic, active listening, taking account of non-verbal communication and how something is said);



- *open* (sensitive to which aspects of the interview are significant for the interviewee);
- *steering* (keeping to the point);
- *critical* (questioning to check the reliability, consistency and validity of what is being said);
- *able to remember* (recalling earlier statements and relating to them during the interview);
- *able to interpret* (clarifying, confirming and disconfirming the interviewee's statements with the interviewee).

(Kvale, 1996, p.148-9)

The interviewer must learn to establish rapport and make the interviewee feel at ease. The interviewer must not inject his/her own bias into the conversation. Good interview questions should not include 'yes' or 'no' questions or disguise multiple questions as a single question. The questions should be asked slowly and exactly as worded. Appropriately conducted interviews would permit in-depth perspectives on monitoring pupils' health, activity, and fitness in terms of HoPEs' views, approaches and practices.

### **3.5.5 Interview Data Analysis**

The aims of qualitative analysis are to reflect the complexity of phenomena, and to present the underlying structures that 'make sense' of that complexity (Green & Thorogood, 2004), p.175). A series of stages were involved in the analysis of the interview data.

1. **Transcription:** Interview recording data were listened to and transferred into written form. The transcriptions were read several times to prevent data omission or misunderstandings.

2. Coding: The second stage was to organise the raw data into conceptual categories and create themes/concepts, and delineate units of meaning relevant to the aims of study. This reduced the large amount of data into manageable chunks, and helped in retrieving parts of the data quickly. Two levels of coding were undertaken:

(1) Open coding, which involved:

- a. Reading all field notes and other data.
- b. Writing a preliminary code label on the edge of a record.
- c. Assigning colored labels (or codes) to textual data.

(2) Axial coding:

- a. Reviewing and examining initial codes and thinking about linkages between concepts. For example,
- b. Organizing and identifying the axis of key concepts.
- c. Developing cluster categories/concepts.

3. Thematic analysis: This involved moving beyond simply categorizing and coding the data to thinking about how the codes related to each other. It involved the identification of general and unique codes and clusters from all the interview data through contextualization of the themes. Table 3.2 is an example of the theme analysis process that was undertaken.

Table 3.2 An Example of the Thematic Analysis Process

Reasons for not monitoring pupils' physical activity (RNPA)			
	Open coding	Axial coding	Themes
RNPA	If I had more time, I would do it	Time (RNPA-T)	Purpose and value
	Not see the value of monitoring	Value (RNPA-V)	
	It is unrealistic to follow them	Resource (RNPA-R)	Limitation and issues
	Fitness testing will improve physical activity	Confusion (RNPA-C)	
	Until there are less demands on us	Time (RNPA-T)	Resources and support
	We got to cover NCPE	Limitation (RNPA-L)	Conceptual confusion
	That's whole school's approach	Responsibility (RNPA-R)	Whose responsibility
	Parents should be part of it	Responsibility (RNPA-R)	

4. Validity: The following steps were used to increase the accuracy of the analysis of the interview data.

- a. The transcription text context was re-checked by a native English professional to prevent data omission or misunderstanding.
- b. The original transcription text and the results of the thematic analysis were verified by the researcher's supervisors.

### 3.6 Research Ethics

In this study, the research design, sampling techniques and methods took into consideration ethical issues associated with the research (Gratton & Jones, 2004) and the university's ethical procedures were followed. For example, all participants were informed of the purpose of the study, and the use of the data before data collection. In

terms of confidentiality, all participants were informed that schools and individuals would not be identified by name in any reporting. This was to be achieved through the use of pseudonyms with the interview data, and assigning numbers within the questionnaires to individuals in the data set (Gratton & Jones, 2004). It was furthermore made clear that involvement in the interviews was subject to the agreement of the individuals concerned and was arranged at a time and quiet place to suit them. Finally, the subjects were informed that they had the right to withdraw from the study at any time (Gratton & Jones, 2004).

## Chapter 4: Survey Results

### 4.1 Introduction

The main findings of the questionnaire survey relating to health, physical activity and fitness monitoring within the secondary school curriculum in England are reported in this chapter. The results of the survey are presented in seven main sections: (1) general information, (2) monitoring young people's health, (3) monitoring young people's physical activity, (4) monitoring young people's fitness, (5) monitoring health, physical activity and fitness within the school PE curriculum, and (6) HoPEs' attitudes and views towards monitoring. Within each section, descriptive data are presented either as text, tables and/or figures.

### 4.2 Section 1: General Information

The survey questionnaires were returned by 118 schools, which comprised a response rate of 38.4 per cent. As can be seen from Table 4.1, just less than three quarters of the schools that responded to the questionnaire were state comprehensives (74.6 per cent), and a few were state grammar (4.2 per cent) or grant maintained secondary schools (3.4 per cent). Of these, 13.6 per cent were specialist sports colleges.

Table 4.1 Type of Secondary School

Type of School	%
State comprehensive	74.6
Specialist sport college	13.6
State grammar	4.2
Grant maintained secondary	3.4
City technology college	0.8
Other	3.2

The majority of schools were in the 11-18 (48.3 per cent) or 11-16 (43.2 per cent) age range (Table 4.2). Most were mixed sex (83.9 per cent) with just 6.8 per cent and 5.1 per cent all boys' or all girls' schools respectively.

Table 4.2 Age Range of Pupils

Age Range	%
11-18 years	48.3
11-16 years	43.2
14-18 years	2.5
11-14 years	0.8
Other	5.1

### 4.3 Section 2: Monitoring Young People's Health

Over a third (39 per cent) of schools monitored pupils' health within the school curriculum, whilst over sixty percent (61 per cent) did not. Further, over half (55.6 per cent) considered that health should be monitored within the school curriculum. The reasons for this included: (1) to raise awareness of the importance of a healthy lifestyle; (2) as a means of assessing pupils' progress; and (3) to detect health problems (e.g. obesity). However, over forty percent of schools (44.4 per cent) considered that health should not be monitored within the school curriculum. Their reasons for this were: (1) it is too time consuming / there is insufficient time; and (2) it is not the role / responsibility of schools.

In the schools that monitored pupils' health, the HoPEs gave the following reasons for doing so: to give pupils knowledge of their own health, and to help them to plan for a healthier lifestyle and for their own welfare. Amongst these schools,

nearly all (95.8 per cent) monitored pupils' cardiovascular health and over half of them monitored pupils' weight (54.0 per cent), height (56.5 per cent), or body composition (58.7 per cent). Less than one third (28.2 per cent) of schools monitored pupils' blood pressure and one fifth (20 per cent) monitored pupils' mental health.

In terms of the frequency of health monitoring, health was monitored occasionally in 23.9 per cent of schools, once a year in 39.1 per cent of schools, and two or more times a year in 37 per cent of schools. Nearly 30 per cent of the monitoring was executed at the beginning of the year (28.0 per cent), one fifth (21.7 per cent) occurred during the middle of the year, and 17.4 per cent of schools monitored pupils' health at the end of the year. Just less than two thirds of HoPEs (63.0 per cent) reported the frequency of monitoring to be variable.

#### **4.4 Section 3: Monitoring Young People's Physical Activity**

Over sixty percent of schools (61.9 per cent) monitored pupils' physical activity within the curriculum. The main reasons for doing so included: to assess pupils' physical activity levels; to measure pupils' progress; and to encourage participation rates in extra-curricular clubs.

Of the schools that monitored pupils' physical activity, the class register for PE lessons was the most commonly used method (72.6 per cent). Observation was used by more than two thirds of the schools (67.1 per cent), and questionnaires or heart rate monitoring were used by 36.9 per cent and 34.2 per cent of schools respectively. One fifth of schools (20.5 per cent) used activity diaries. A small proportion (4.1 per cent) used pedometers to monitor pupils' activity whilst no schools used accelerometers (see Figure 4.1).

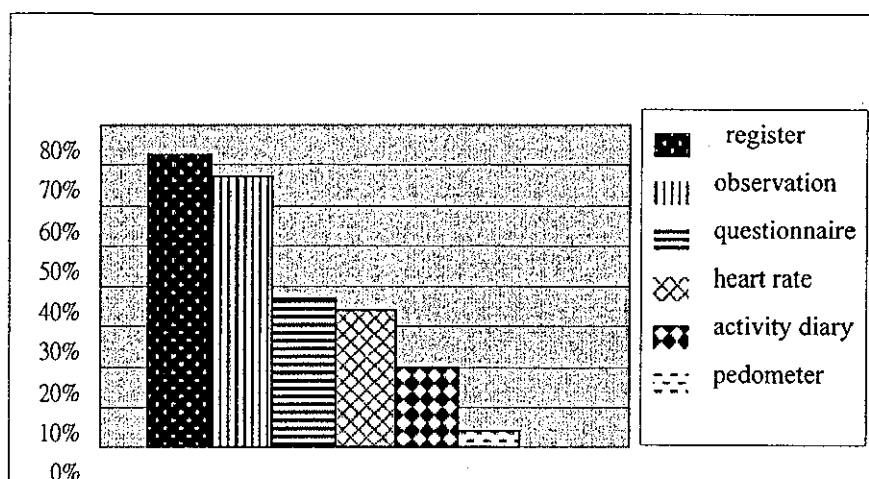


Figure 4.1 Methods of Monitoring Activity in Secondary Schools (n=73)

Physical activity was monitored two or more times a year in 65.8 per cent of schools, once a year in 17.8 per cent and occasionally in 16.4 per cent. Most schools (86.3 per cent) did not monitor pupils' physical activity at any specific time during the year, 9.5 per cent of schools conducted monitoring at the end of the year, and 5.4 per cent during the middle of the year. In 4.1 per cent of schools, the monitoring was executed at the beginning of the year.

Over a quarter (26.7 per cent) of the schools that did not monitor pupils' physical activity in the PE curriculum nonetheless considered it desirable to do so. The reasons HoPEs gave for this included: (1) as a means of promoting physical activity; (2) to identify pupils' physical activity needs; and (3) to monitor progress. In those schools that did not monitor pupils' physical activity, nearly three quarters (73.3 per cent) however, thought that physical activity should not be monitored within school for the following reasons: (1) insufficient time and money; (2) do not see the value of physical activity monitoring; (3) it is not the role of physical education.

#### 4.5 Section 4: Monitoring Young People's Fitness

Most schools (89.0 per cent) monitored pupils' fitness within the school PE



curriculum. The main reasons HoPEs gave for this were: to improve pupils' fitness; to inform and advise pupils about the importance of fitness; and to monitor their progress in fitness testing. Many schools monitored health-related components of fitness. Most monitored pupils' aerobic capacity (98.0 per cent), muscular strength/endurance (91.4 per cent), and flexibility (91.4 per cent) and over one third (36.2 per cent) monitored pupils' body composition. More than two thirds of schools also monitored pupils' skill-related fitness in terms of speed (83.8 per cent), agility (79.0 per cent), balance (74.2 per cent), co-ordination (71.4 per cent), power (68.5 per cent), and reaction time (64.7 per cent).

A variety of fitness tests were used. The Multi-Stage Fitness test was the most frequently cited (95.2 per cent) means of monitoring pupils' fitness. Other common tests included sit and reach (91.4 per cent), sit up / curl up (82.9 per cent), time / distance run (80.9 per cent), step test (68.6 per cent), shuttle run (58.1 per cent) and skinfold measurements (30.5 per cent). A few schools (7.6 per cent) used laboratory equipment (e.g. a cycle ergometer or treadmill) to test pupils' fitness (see Figure 4.2).

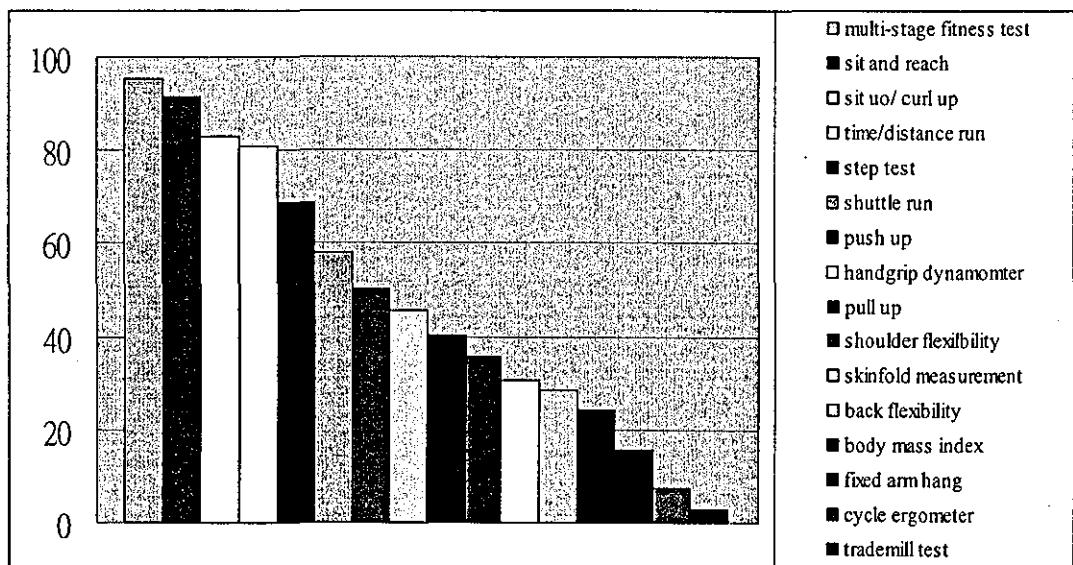


Figure 4.2 Fitness Tests Employed in Secondary School (n=105)

Fitness was monitored two or more times a year in 46.7 per cent of schools, once a year in 39.0 per cent of schools and occasionally in 17.1 per cent. Over two thirds of

schools (67.6 per cent) monitored pupils' fitness at no specific time of the year, one fifth (20.9 per cent) conducted monitoring at the beginning of the year, another fifth (20.0 per cent) conducted it during the middle of the year, and 4.7 per cent at the end of the year.

Within the schools that did not monitor pupils' fitness, over a third of HoPEs (38.5 per cent) thought that it should be monitored within the school curriculum. The reasons HoPEs gave for this included: (1) to inform and advise about the importance of fitness; (2) to monitor progress in fitness testing; and (3) to facilitate goal setting. However, over sixty percent of these HoPEs (61.5 per cent) considered that fitness should not be monitored within the school curriculum. Their reasons for this included: (1) insufficient time and money; (2) pressure of the National Curriculum; and (3) the difficulty of target setting in this area.

#### **4.6 Section 5: Monitoring Health, Physical Activity and Fitness within the PE Curriculum**

Over a quarter of schools (28.8 per cent) monitored health, physical activity and fitness within the PE curriculum, whilst just over a third (35.6 per cent) monitored two of these components, and just less than a third (32.2 per cent) monitored only one component (i.e. health, physical activity or fitness). A small minority of schools (3.4 per cent) did not monitor any of these components (see Table 4.3).

Table 4.3 Secondary Schools Monitoring Health (H), Physical Activity (A) and/or Fitness (F)

Monitoring all 3 (HAF)	Monitoring 2 (HAF)	Monitoring 1 (HAF)	Monitoring none (HAF)
28.8%	35.6%	32.2%	3.4%

The percentage of schools that included health, physical activity and/or fitness monitoring as a compulsory component of the PE curriculum for years 7 to 13 (aged 11-18) are summarised in Table 4.4.

Table 4.4 Monitoring Health, Physical Activity and/or Fitness as a Compulsory Component of the PE Curriculum

Item \ Year	7	8	9	10	11	12	13
	%	%	%	%		%	%
<b>Monitoring Health</b>	28.8	28.0	32.2	26.3	23.7	3.4	3.4
<b>Monitoring Physical Activity</b>	41.5	40.7	41.5	41.5	40.7	10.2	10.2
<b>Monitoring Fitness</b>	57.6	55.1	63.3	55.9	45.8	11.9	11.0

Overall, among those schools that monitored health, physical activity and/or fitness, fitness monitoring was given the greatest emphasis (53.4 per cent), activity monitoring was afforded the next most emphasis (21.2 per cent) and health monitoring the least (5.1 per cent).

HoPEs also commented upon pupils' responses to monitoring health, physical activity and/or fitness, a summary of which is presented in Table 4.5. As can be seen from the table, pupils' responses to health, physical activity and/or fitness monitoring were perceived by the majority of HoPEs to be mainly positive or neutral. However, approximately 20 per cent of HoPEs considered girls' responses to monitoring health and fitness to be negative.

Table 4.5 HoPEs' Perceptions of Pupils' Responses to Health, Physical Activity and/or Fitness Monitoring

HoPEs' Perceptions of Pupils' Response	Monitoring Health			Monitoring Physical Activity			Monitoring Fitness		
	Boys %	Girls %	Mixed %	Boys %	Girls %	Mixed %	Boys %	Girls %	Mixed %
<b>Positive</b>	65.0	40.0	65.0	75.0	50.0	73.5	89.7	40.0	90.7
<b>Negative</b>	10.0	20.0	0.0	0.0	6.3	0.0	5.1	23.3	0.0
<b>Neutral</b>	15.0	40.0	27.5	20.8	43.8	14.3	5.1	33.3	7.4
<b>Not Applicable</b>	10.0	0.0	7.5	4.2	0.0	12.2	0.0	3.3	1.9

HoPEs were asked whether they reported monitoring information to parents either verbally or in a written report. Over forty percent (44.9 per cent) stated that they reported fitness information to parents, over a quarter (27.1 per cent) reported physical activity information, and nearly ten percent (9.3 per cent) reported health information to parents.

Table 4.6 summarises the survey findings in relation to monitoring pupils' health, physical activity and fitness within the secondary school PE curriculum in England. The table refers to the prevalence and purpose of monitoring, the items/instruments involved, and the constraints or issues associated with monitoring.

Table 4.6 A Summary of the Survey Findings in relation to Monitoring Pupils' Health, Physical Activity and Fitness within the Secondary School PE Curriculum in England.

	Prevalence	Items Monitored or Instruments Used	Purpose of Monitoring	Constraints and/or Issues
Monitoring Health	39.0%	<ol style="list-style-type: none"> <li>1. Cardiovascular health: 95.8%</li> <li>2. Weight: 54.0%</li> <li>3. Height: 56.5%</li> <li>4. Body composition: 58.7%</li> <li>5. Blood pressure: 28.2%</li> <li>6. Mental health: 20.0%</li> </ol>	<ol style="list-style-type: none"> <li>1. To raise awareness of the importance of a healthy lifestyle.</li> <li>2. As a means of assessing pupils' progress.</li> <li>3. To detect health problems (e.g. obesity)</li> </ol>	<ol style="list-style-type: none"> <li>1. Time consuming.</li> <li>2. Insufficient time.</li> <li>3. It is not the role / responsibility of schools.</li> </ol>
Monitoring Physical Activity	61.9%	<ol style="list-style-type: none"> <li>1. Register: 72.6%</li> <li>2. Observation: 67.1%</li> <li>3. Questionnaires: 36.9%</li> <li>4. Heart rate: 34.2%</li> <li>5. Diary: 20.5%</li> <li>6. Pedometer: 4.1%</li> <li>7. Accelerometers: 0%</li> </ol>	<ol style="list-style-type: none"> <li>1. As a means of promoting physical activity.</li> <li>2. To identify pupils' physical activity needs.</li> <li>3. To monitor progress.</li> </ol>	<ol style="list-style-type: none"> <li>1. Insufficient time and money.</li> <li>2. Do not see the value of physical activity monitoring.</li> <li>3. It is not the role of physical education.</li> </ol>
Monitoring Fitness	89.0%	<ol style="list-style-type: none"> <li>1. Aerobic capacity: 98%</li> <li>2. Muscular strength/ endurance: 91.4%</li> <li>3. Flexibility: 91.4%</li> <li>4. Body composition: 36.2%</li> <li>5. Speed: 83.8%</li> <li>6. Agility: 79.0%</li> <li>7. Balance: 74.2%</li> <li>8. Co-ordination: 71.4%</li> <li>9. Power: 68.5%</li> <li>10. Reaction time: 64.7%</li> </ol>	<ol style="list-style-type: none"> <li>1. To improve pupils' fitness.</li> <li>2. To inform and advise pupils about the importance of fitness.</li> <li>3. To monitor pupils' progress in fitness testing.</li> </ol>	<ol style="list-style-type: none"> <li>1. Insufficient time and money.</li> <li>2. Pressure of the National Curriculum.</li> <li>3. Difficulty of target setting in this area.</li> </ol>

#### 4.7 Section 6: HoPEs' Attitudes and Views towards Monitoring

Twelve statements were included in the questionnaire to determine HoPEs' attitudes towards and views towards the monitoring of health, physical activity and fitness within the PE curriculum. The findings are presented in Table 4.7.

Table 4.7 HoPEs' Attitudes and Views towards Monitoring

Attitudes and Views Statements	Agree or Strongly agree (%)	Uncertain (%)	Disagree or Strongly Disagree (%)
a. Monitoring young people's health should be an important component of any PE programme	68 (57.6)	29 (24.6)	21 (17.8)
b. Monitoring young people's physical activity is a waste of time	8 (6.8)	17 (14.1)	93 (78.8)
c. It is desirable to monitor young people's health within the school curriculum	72 (75.4)	25 (21.2)	21 (17.8)
d. Monitoring young people's physical activity was problematic within the school curriculum	89 (75.4)	17 (14.4)	12 (10.2)
e. Promoting and monitoring physical activity is more important than promoting and monitoring fitness within the curriculum	68 (57.6)	17 (14.4)	33 (28.0)
f. Fitness testing merely distinguishes the mature and motivated pupils from the less mature and de-motivated	4 (3.4)	16 (13.6)	98 (83.1)
g. Too much time is spent on monitoring young people's fitness within the school curriculum	25 (21.2)	25 (21.2)	68 (57.6)
h. More emphasis should be placed on monitoring young people's fitness within the PE curriculum	58 (49.2)	29 (24.6)	31 (26.3)
i. Fitness testing can be effective in promoting physical activity and fitness	90 (76.3)	25 (21.2)	3 (2.5)
j. It is more appropriate to monitor health-related fitness than skill-related fitness	99 (83.9)	14 (11.9)	5 (4.2)
k. Schools have a responsibility to monitor pupils' health, physical activity and fitness	48 (40.7)	39 (33.1)	21 (26.3)
l. The way in which monitoring is carried out influences young people's attitudes towards their health, activity and fitness	46 (39.0)	46 (39.2)	26 (22.0)

#### 4.7.1 The HoPEs' Gender and Teaching Experience

Of the 118 HoPEs who responded to the survey questionnaire, just less than two thirds (64.4 per cent) were male and over a third (35.6 per cent) female (Table 4.8).

Well over three quarters of them (85.6 per cent) had been a PE teacher for more than 5 years and less than one fifth (14.4 per cent) had been a PE teacher for 5 years or less (Table 4.9).

Table 4.8 Gender of HoPEs

	Frequency	%
Male	76	64.4
Female	42	35.6
Total	118	100.0

Table 4.9 Teaching Experience of HoPEs

	Frequency	%
More than 5 years	101	85.6
5 years or less	17	14.4
Total	118	100.0

#### 4.7.1.1 Relationship between Gender and Teaching Experience on Monitoring

##### A. HoPEs' Gender

1. There was no significant relationship ( $p > .05$ ) between the gender of the HoPEs and whether they monitored pupils' health, physical activity and fitness (Table 4.10). The hypothesis that there is a significant relationship between HoPEs' gender and the implementation of healthy, physical activity or fitness monitoring was therefore rejected.

Table 4.10 The Relationship between the Gender of the HoPEs and Monitoring Health, Physical Activity or Fitness

		HoPEs' gender		$\chi^2$
		male (%)	female (%)	
monitor pupils' health	yes	31 (67.4)	15 (32.6)	0.2
	no	45 (62.5)	27 (37.5)	
monitor pupils' activity	yes	48 (65.8)	25 (34.2)	0.1
	no	28 (62.2)	17 (37.8)	
monitor pupils' fitness	yes	65 (61.9)	40 (38.1)	2.6
	no	11 (84.6)	2 (15.4)	

\*  $p < .05$

## B. HoPEs' Teaching Experience

1. There was no significant relationship ( $p > .05$ ) between the teaching experience of the HoPEs and whether they monitored pupils' health, physical activity and fitness (Table 4.11). The hypothesis that there is a significant relationship between HoPEs' teaching experience and the implementation of healthy, physical activity or fitness monitoring was therefore rejected.

Table 4.11 The Relationship between the Teaching Experience of the HoPEs and Monitoring Health, Physical Activity or Fitness

		Teaching Experience		$\chi^2$
		more than 5 years (%)	5 years or less (%)	
monitor pupils' health	yes	40 (87.0)	6 (13.0)	0.1
	no	61 (84.7)	11 (15.3)	
monitor pupils' activity	yes	62 (84.9)	11 (15.1)	0.1
	no	39 (86.7)	6 (13.3)	
monitor pupils' fitness	yes	89 (84.8)	16 (15.2)	0.5
	no	12 (92.3)	1 (7.7)	

\*  $p < .05$



#### **4.7.1.2 Relationship between HoPEs' Gender and Teaching Experience on their Attitudes and Views towards Monitoring**

##### **A. HoPEs' Gender**

There were significant relationships ( $p < .05$ ) between the gender of HoPEs and specific attitudes and views towards certain aspects of monitoring (see Table 4.12). Thus, the hypothesis was accepted for specific attitudes and views. The results were listed below (Table 4.12):

- (1) Statement 'a'- Monitoring young people's health should be an important component of any PE programme. More than half of the HoPEs of both genders agreed or strongly agreed with this statement. However, more male HoPEs (22.4 per cent) disagreed or strongly disagreed with this statement than female HoPEs (9.5 per cent). Furthermore, more female HoPEs (40.5 per cent) than males (15.8 per cent) expressed an uncertain attitude.
- (2) Statement 'c'- It is desirable to monitor young people's health within the school curriculum. More than half of the HoPEs of both genders agreed or strongly agreed with this statement and more male HoPEs (21.1 per cent) disagreed or strongly disagreed with this statement than female HoPEs (17.8 per cent).
- (3) Statement 'h'- More emphasis should be placed on monitoring young people's fitness within the PE curriculum. More male HoPEs (53.9 per cent) agreed or strongly agreed with this statement than female HoPEs (40.5 per cent). More male HoPEs (28.9 per cent) also disagreed or strongly disagreed with this statement than female HoPEs (21.4 per cent). Furthermore, more female HoPEs (38.1 per cent) than males (17.1 per cent) expressed an uncertain attitude.

Table 4.12 The Relationship between the Gender of the HoPEs and their Attitudes and Views towards Monitoring.

	Agree or Strongly Agree (%)	Uncertain (%)	Disagree or strongly Disagree (%)	$\chi^2$
<b>a. Monitoring young people's health should be an important component of any PE programme</b>				
male	47 (61.8)	12 (15.8)	17 (22.4)	9.8 **
female	21 (50.0)	17 (40.5)	4 (9.5)	
<b>b. Monitoring young people's physical activity is a waste of time</b>				
male	5 (6.6)	13 (17.1)	58 (76.3)	1.2
female	3 (7.1)	4 (9.5)	35 (83.3)	
<b>c. It is desirable to monitor young people's health within the school curriculum</b>				
male	49 (64.5)	11 (14.5)	16 (21.1)	6.2*
female	23 (54.8)	14 (33.3)	5 (11.9)	
<b>d. Monitoring young people's physical activity was problematic within the school curriculum</b>				
male	58 (76.3)	10 (13.2)	8 (10.5)	0.2
female	31 (73.8)	7 (16.7)	4 (9.5)	
<b>e. Promoting and monitoring physical activity is more important than promoting and monitoring fitness within the curriculum</b>				
male	41 (53.9)	13 (17.1)	22 (28.9)	1.6
Female	27 (64.3)	4 (9.5)	11 (26.2)	
<b>f. Fitness testing merely distinguishes the mature and motivated pupils from the less mature and de-motivated</b>				
male	1 (1.3)	9 (11.8)	66 (86.8)	3.5
female	3 (7.1)	7 (16.7)	32 (76.2)	
<b>g. Too much time is spent on monitoring young people's fitness within the school curriculum</b>				
male	18 (23.7)	14 (18.4)	44 (57.9)	1.4
female	7 (16.7)	11 (26.2)	24 (57.1)	
<b>h. More emphasis should be placed on monitoring young people's fitness within the PE curriculum</b>				
male	41 (53.9)	13 (17.1)	22 (28.9)	6.4*
female	17 (40.5)	16 (38.1)	9 (21.4)	
<b>i. Fitness testing can be effective in promoting physical activity and fitness</b>				
male	56 (73.7)	18 (23.7)	2 (2.6)	0.8
female	34 (81.0)	7 (16.7)	1 (2.4)	
<b>j. It is more appropriate to monitor health-related fitness than skill-related fitness</b>				
male	67 (88.2)	6 (7.9)	3 (3.9)	3.3
female	32 (76.2)	8 (19.0)	2 (4.8)	
<b>k. Schools have a responsibility to monitor pupils' health, physical activity and fitness</b>				
male	30 (39.5)	24 (31.6)	22 (28.9)	0.8
female	18 (42.9)	15 (35.7)	9 (21.4)	
<b>l. The way in which monitoring is carried out influences young people's attitudes towards their health, activity and fitness</b>				
male	29 (38.2)	31 (40.8)	16 (21.1)	0.3
female	17 (40.5)	15 (35.7)	10 (23.8)	

\*\*p<.01, \* p<.05

## B. HoPEs' Teaching Experience

There was no significant relationship ( $p > .05$ ) between the HoPEs' teaching experience and their attitudes and views towards the twelve statements (Table 4.13).

The hypothesis was therefore rejected.

Table 4.13 The Relationship between the Teaching Experience of the HoPEs and their Attitudes and Views towards Monitoring.

	Agree or strongly agree (%)	Uncertain (%)	Disagree or Strongly Disagree (%)	$\chi^2$
<b>a. Monitoring young people's health should be an important component of any PE programme</b>				
more than 5 years	56 (55.4)	26 (25.7)	19 (18.8)	1.3
5 years or less	12 (70.6)	3 (17.6)	2 (11.8)	
<b>b. Monitoring young people's physical activity is a waste of time</b>				
more than 5 years	7 (6.9)	16 (15.8)	78 (77.2)	1.2
5 years or less	1 (5.9)	1 (5.9)	15 (88.2)	
<b>c. It is desirable to monitor young people's health within the school curriculum</b>				
more than 5 years	64 (63.4)	20 (19.8)	17 (16.8)	1.6
5 years or less	8 (47.1)	5 (29.4)	4 (23.5)	
<b>d. Monitoring young people's physical activity was problematic within the school curriculum</b>				
more than 5 years	78 (77.2)	14 (13.9)	9 (8.9)	1.5
5 years or less	11 (64.7)	3 (17.6)	3 (17.6)	
<b>e. Promoting and monitoring physical activity is more important than promoting and monitoring fitness within the curriculum</b>				
more than 5 years	59 (58.4)	14 (13.9)	28 (27.7)	0.2
5 years or less	9 (52.9)	3 (17.6)	5 (29.4)	
<b>f. Fitness testing merely distinguishes the mature and motivated pupils from the less mature and de-motivated</b>				
more than 5 years	2 (2.0)	14 (13.9)	85 (84.2)	4.2
5 years or less	2 (11.8)	2 (11.8)	13 (76.5)	
<b>g. Too much time is spent on monitoring young people's fitness within the school curriculum</b>				
more than 5 years	22 (21.8)	22 (21.8)	57 (56.4)	0.4
5 years or less	3 (17.6)	3 (17.6)	11 (64.7)	
<b>h. More emphasis should be placed on monitoring young people's fitness within the PE curriculum</b>				
more than 5 years	48 (47.5)	26 (25.7)	27 (26.7)	0.8
5 years or less	10 (58.8)	3 (17.6)	4 (23.5)	
<b>i. Fitness testing can be effective in promoting physical activity and fitness</b>				
more than 5 years	74 (73.3)	24 (23.8)	3 (2.9)	3.5
5 years or less	16 (94.1)	1 (5.9)	0 (0)	
<b>j. It is more appropriate to monitor health-related fitness than skill-related fitness</b>				

more than 5 years	85 (84.2)	12 (11.9)	4 (4.0)	0.1
5 years or less	14 (82.4)	2 (11.8)	1 (5.9)	
<b>k. Schools have a responsibility to monitor pupils' health, physical activity and fitness</b>				
more than 5 years	41 (40.6)	34 (33.7)	26 (25.7)	0.1
5 years or less	7 (41.2)	5 (29.4)	5 (29.4)	
<b>l. The way in which monitoring is carried out influences young people's attitudes towards their health, activity and fitness</b>				
more than 5 years	39 (38.6)	38 (37.6)	24 (23.8)	1.3
5 years or less	7 (41.2)	8 (47.1)	2 (11.8)	

\*  $p < .05$

## **Chapter 5: Interview Data Findings**

### **5.1 Introduction**

The interview data revealed a range of views held by HoPEs about monitoring pupils' health, physical activity and fitness within the school curriculum. Amongst the views expressed, the following common themes emerged:

- Purpose and Value of Monitoring
- Learning and Assessment
- Concerns about Pupils' Health, Physical Activity and Fitness
- Whose Responsibility?
- Pupils' Responses and Attitudes
- Age and Gender Issues
- Conceptual Confusion
- Teacher Resources and Support
- Limitations and Issues.

These common themes and associated issues are exemplified in this chapter.

### **5.2 Data Analysis**

#### **5.2.1 Purpose and Value of Monitoring**

All the HoPEs interviewed were able to identify some purpose for and value to monitoring pupils' health, physical activity and fitness. These usually related to monitoring leading to improvements and providing a useful benchmark or baseline.

For example, one HoPE explained:

*I think it's useful to find out what stage children are at, so you can put a baseline and move on from there. We need to sort of know where we start to where we go...we have to use it for parts of our school monitoring.*

*(Male HoPE; 18 years teaching experience; School F; 2004)*

Other HoPEs expressed similar views:

*The pupils can look at it. They can know what their scores were previously. They can then be given target scores to achieve next time. From that, we can take it a stage further and we can try to push them or ask them to perform a certain activity.*

*(Male HoPE; 3.5 years teaching experience; School A; 2004)*

*One of the big issues with young people is making them aware of their own fitness. Therefore, we use our monitoring to actually ensure that they understand where they're at and what might be the changes that they're undergoing.*

*(Male HoPE; 28 years teaching experience; School B; 2004)*

Some considered it important for pupils to see evidence of progress over time:

*You can actually give them some evidence that they're either improving or not, then it helps you to give some validity to the activities that you're saying are important.*

*(Male HoPE; 17 years teaching experience; School H; 2004)*

*I think it's important to see the progress that's made from when they start the school, because we hope to see them improve. But also, just for young people in general, just to see how fit and healthy our young people are.*

*(Female HoPE; 12 years teaching experience; School E; 2004)*

Some HoPEs used monitoring for motivational purposes, rewarding pupils for the progress made:

*They can see where they are...and also to give them credits and examination and the next time if they've got better, they can be rewarded for that.*

*(Male HoPE; 18 years teaching experience; School F; 2004)*

*At the end of the year we look at all the bronzes, silvers, and golds that they've achieved and we buy them badges so that they can put them onto their school uniform. They like that.*

*(Male HoPE; 15 years teaching experience; School I; 2004)*

Some HoPEs reported that they provided monitoring information to parents. For example, one stated:

*We tend to make a comment on pupils' reports regarding their levels of health and fitness so that parents can see that....If there are children that are consistently not taking part, the parents are always informed.*

*(Male HoPE; 17 years teaching experience; School H; 2004)*

Other HoPEs explained they provided monitoring information to parents more

selectively:

*We provide this information to parents only if they come into the school and they can see it on display.*

*(Male HoPE; 17 years teaching experience; School H; 2004)*

*This will be kept as a permanent record by us which we can then show their parents when they come in for parents' days:*

*(Male HoPE; 3.5 years teaching experience; School A; 2004)*

One HoPE explained that his school used the information for diagnostic purposes:

*We use it to target pupils that we know we should develop because they have strengths or abilities in an area.*

*(Male HoPE; 28 years teaching experience; School B; 2004)*

He went on to explain:

*It also gives us some data to work on so that we know those who aren't fast, those who aren't strong, and those who have a weakness in one of the areas of fitness.*

*(Male HoPE; 28 years teaching experience; School B; 2004)*

Some interviewees expressed concerns over pupils' physical activity and/or declared that they used monitoring to promote health and physical activity:

*As a PE teacher, that is what my whole job is about, to promote active*



*lifestyles... I want every student to be engaging in some kind of activity in adulthood. But with that would come health.*

*(Female HoPE; 12 years teaching experience; School E; 2004)*

*We tend to encourage pupils to do as wide a range of activities as they possibly can do, because we think it's more important for them to get a wide base of experience. You can encourage them to perhaps either look at different activities or even to perhaps be a little bit more adventurous and look for a wider range of activities.*

*(Male HoPE; 20 years teaching experience; School L; 2004)*

*What we should be doing is encouraging young kids to take part in physical activity after they've left school.*

*(Male HoPE; 4 years teaching experience; School D; 2004)*

Finally, some HoPEs reported that they monitored physical activity to gain external recognition/rewards. One explained:

*We're trying to go for this thing called Sportsmark, which is like a grading for your school to show that you run clubs after school, and keep records of the kids that come. So we're trying to build up a bank of information of kids who come to after-school clubs. Who they are, what clubs they go to, to show that we're providing opportunity for children to practise sport after school and outside of normal curriculum hours.*

*(Male HoPE; 3.5 years teaching experience; School A; 2004)*

## 5.2.2 Learning and Assessment

Some HoPEs believed that monitoring could develop children's knowledge and understanding of health, physical activity and fitness. This was illustrated in the following quotations:

*Most kids think about fitness as the ability to play football. They do learn that fitness is a much wider issue than just running.*

*(Female HoPE; 34 years teaching experience; School C; 2004)*

*They're gradually getting to understand that it is good for them and it's sort of part and parcel of their everyday life.*

*(Male HoPE; 18 years teaching experience; School F; 2004)*

*... try to get them involved in sporting activities, talk to them about heart rate and stuff like that. Basically make them aware that is the sort of level they should be working and looking at keeping a healthy heart, healthy lungs, etc.*

*(Male HoPE; 3.5 years teaching experience; School A; 2004)*

*They learn a lot about the effects of exercise on the body, for example recording their heart beat and recovery rate and pulse testing.*

*(Male HoPE; 17 years teaching experience; School H, 2004)*

*We can get them on to the way of knowing how they should look after their bodies and how they should eat healthily and exercise regularly. If we get that in to them then with that they should have a longer, happier, healthier life.*

*(Female HoPE; 29 years teaching experience; School J; 2004)*

*For their own benefit, children to see what they're doing and showing them the right things to do and how it helps them and benefits in the long-term. Generally making them aware that it is quite important. They're gradually getting to understand that it is good for them and it's sort of part and parcel of their everyday life.*

*(Male HoPE; 18 years teaching experience; School F; 2004)*

*Whereas activity can influence health, I think being active and making students aware of the exclusive link between activity and health is the most important of these.*

*(Female HoPE; 12 years teaching experience; School R; 2004)*

In contrast however, one HoPE stated:

*To be honest, I don't think pupils realize what's going on about the monitoring sometimes. The monitoring for them is just such a part of the curriculum that goes on that they get used to it. It just happens to them constantly.*

*(Male HoPE; 4 years teaching experience; School D; 2004)*

### **5.2.3 Concerns about Pupils' Health, Physical Activity and Fitness**

Most HoPEs expressed some concerns about pupils' state of health and levels of physical activity and fitness. For instance, one HoPE explained:

*We have a lot of children who aren't really active outside of school. We have a lot of children which kind of fall into kind of a rather unfit lifestyle with their diet*

*and habits. Missing meals, eating junk food quite a lot. Not really being that active and getting involved in things that they perhaps shouldn't do at an early age.*

*(Male HoPE; 3.5 years teaching experience; School A; 2004)*

Another HoPE expressed similar concerns:

*I think students' health is on a downward trend. It would be important for students to know that their health is suffering, and that there is something that they can do about it.*

*(Female HoPE; 12 years teaching experience; School E; 2004)*

With regards to physical activity levels specifically, some HoPEs expressed the following concerns about pupils not being active enough:

*There is quite a lot of large lads around now who do not do as much as they should.*

*(Male HoPE; 18 years teaching experience; School F; 2004)*

*They certainly aren't doing as much exercise as they should be.*

*(Male HoPE; 15 years teaching experience; School I; 2004)*

Likewise, similar concerns were expressed about pupils' fitness levels:

*There's a danger that too many students now are not doing enough to sustain good levels of fitness.*

*(Female HoPE; 12 years teaching experience; School E; 2004)*

*Young people aren't as fit as they should be.*

*(Male HoPE; 15 years teaching experience; School I; 2004)*

*I've done this job now for twenty years and I've definitely noticed that the levels of fitness for young people are definitely deteriorating.*

*(Male HoPE; 20 years teaching experience; School L; 2004)*

*It is obviously a government issue at the moment...the whole range of fitness and how unfit we are as a society. As PE educators, we need to address that and try to make children aware of it.*

*(Male HoPE; 18 years teaching experience; School F; 2004)*

#### **5.2.4 Whose Responsibility?**

When discussing who was responsible for pupils' health, physical activity and fitness, most HoPEs interviewed considered that the responsibility should lie not only with PE teachers but also with the whole school, parents, health professionals and society as a whole. One HoPE who accepted that PE teachers had a responsibility in this area stated:

*If we don't have active children, then we're probably not doing our job. So we've got to make sure that we know our children are active all the time. So through our assessments, through extra-curricular activity, through clubs, we can get a good idea who's doing what and how often. We can then monitor children and see how active they are in their lessons...We actually get a good idea of what they're actually doing from week to week. Even like walking a dog or doing*

*paper rounds.*

*(Male HoPE; 3.5 years teaching experience; School A; 2004)*

And he stated:

*I think as a department we're moving in the correct direction to make sure our monitoring of all our aspects, not just in fitness, is done in the correct manner and is done within the time frame that suits us and gives us a workload which is manageable...giving us more time, freeing up certain lessons to help us assess.*

*(Male HoPE; 3.5 years teaching experience; School A; 2004)*

Many interviewees agreed that monitoring should be part of a school's responsibility:

*I think it has to be a whole school approach to the problem. We use PSHE (Personal, Social and Health Education) sessions, rather than just PE sessions, because a lot of kids do still associate PE with playing games. So I think it's the whole school and it would be a lot easier.*

*(Male HoPE; 4 years teaching experience; School D; 2004)*

*The school has a lot of responsibility for their (pupils') well-being. I think every school has the obligation to make sure that the children in their school are happy, they're being looked after, they're socially developing, and they're developing in a way that's going to lead to a happier, more successful life in the future.*

*(Male HoPE; 3.5 years teaching experience; School A; 2004)*

One HoPE recognised that the support of others within the school was needed:

*To monitor them and keep on track of them would be a full time job. Yes, the idea is fantastic if we could get a nurse or something like that in who had the time to talk to each child and find out what they are doing fitness-wise and what they are doing diet wise then that would be good too. To do that in the curriculum, I think is unrealistic.*

*(Male HoPE; 23 years teaching experience; School K; 2004)*

And he continued to explain:

*If there are issues about health then schools are the obvious place to pick them up....we need people well qualified to pick up the whole issue. You know as you said the fitness, the diet the sort of general well-being, and the mental well-being of the individual, that needs a well qualified person who's got time on their hands to do that.*

*(Male HoPE; 23 years teaching experience; School K; 2004)*

Another HoPE was not sure that monitoring pupils' health, physical activity or fitness should necessarily be part of a school's responsibility; she stated:

*I think it needs to be monitored. I think students' health is on a downward trend. Whose job is that? I'm not sure that it fits in with the school curriculum. I don't think the school has a responsibility, but that doesn't mean that I don't think it's a good idea. I think it's important to know about their levels of fitness. As a PE teacher, I'm interested in that. But I don't think the school actually has a responsibility to do that.*

*(Female HoPE; 12 years teaching experience; School E; 2004)*

Some HoPEs highlighted the responsibilities of parents in this area. For example, one HoPE stated:

*Schools should offer extra-curricular activities, but if the students don't want to go, that's not up to the school. I think that's the responsibility of parents...because once they leave school, we can't do anything about their fitness. We can't do anything about what they eat, the amount of exercise they do at home, we can't do anything about it.*

*(Male HoPE; 15 years teaching experience; School I; 2004)*

*A large responsibility falls with the parents there....We make a comment on pupils' reports....so that parents can see that.*

*(Male HoPE; 17 years teaching experience; School H; 2004)*

Some HoPEs acknowledged that pupils' health, physical activity and fitness was a shared responsibility between school and home stating:

*I don't think it should just be the school. I think the home should be involved heavily as well.*

*(Female HoPE; 29 years teaching experience; School J; 2004)*

*I think it should be a joint thing between school and home. I don't think schools could only monitor pupils' health. But I think it should be a two-way thing.*

*(Male HoPE; 15 years teaching experience; School I; 2004)*



### 5.2.5 Pupils' Responses and Attitudes

Most interviewees considered that pupils' responses and attitudes toward fitness monitoring were generally positive. They felt that pupils liked to see themselves improve and feel they have achieved something. With respect to fitness monitoring, one HoPE stated:

*The pupils have their levels recorded and the next time they come to do it they're always interested to see if they can beat their previous one. They like to have their scores up on the wall so that they can compare themselves against everybody else.*

*(Male HoPE; 17 years teaching experience; School H; 2004)*

Others highlighted similarly positive views:

*I think on the whole fitness monitoring has proved to be quite positive.*

*Generally they like to look at their progress, and over the year they do three or four tests and then they can see if they've improved. So they usually quite enjoy it on the whole.*

*(Male HoPE; 18 years teaching experience; School F; 2004)*

*They're always excited about what their score's going to be. And if we've done the test previously, they want to know the previous score. And they want to know how they can beat it. They're very positive.*

*(Male HoPE; 3.5 years teaching experience; School A; 2004)*

However, some HoPEs also recognised how monitoring could be a negative experience for those pupils who are inactive, unfit, overweight and/or not good at sport. Some of the potential negative effects on pupils acknowledged by HoPEs are exemplified in the following quotations:

*We care about the physical side of their body. It's not particularly positive for those who aren't achieving good scores...because they'll see others succeeding and they're not.....if they learn from it in a positive way, it's good. If they learn that they are unfit, overweight, can't do PE, then it's a very negative way.*

*(Male HoPE; 28 years teaching experience; School B; 2004)*

*Pupils who consistently fail to meet those standards or fail to meet the criteria often try to make any excuse not to take part. So it's a fine line really, between getting them to take part and not...they just said "I'm not doing it." And it would be a battle of wills for me to get them to do it. They will do it, but they think they're not going to. But they will. So that's the sort of effect that it has, because they don't want to be seen to fail. So they'd rather not do it.*

*(Male HoPE; 15 years teaching experience; School I; 2004)*

*You do get problems whereby you might get the overweight child who will not want to participate in anything physical because of the damage to their self-esteem and their self-concept and the fact that they will feel a bit awkward and uncomfortable with it.*

*(Male HoPE; 20 years teaching experience; School L; 2004)*

Some interviewees identified the Multi-Stage Fitness test in particular as a test that

had negative effects on some pupils. For example, it was reported that:

*They find the Multi-Stage Fitness Test quite hard, and some kids will push themselves right to the end and some will back off too quickly.*

*(Female HoPE; 34 years teaching experience; School C; 2004)*

*The Multi-Stage Fitness Test is quite hard. I don't think the kids like doing that.*

*Some do because some are really good at it, but most of them don't.*

*(Male HoPE; 3.5 years teaching experience; School A; 2004)*

### **5.2.6 Gender and Age Issues**

The HoPEs interviewed identified a number of differences in the responses to monitoring with respect to the gender and age of pupils. For example, boys were reported to be more interested than girls in performing fitness tests and to perform better than girls. Girls, on the other hand, were reported to be more willing to record information than 'push' themselves during tests. Two male HoPEs stated:

*Boys would be happy to have their scores on display. Girls sometimes are a bit reluctant to have their scores on display, or anything about their performance.*

*(Male HoPE; 17 years teaching experience; School H; 2004)*

*I would say that boys have done better...for the simple reason that the boys do it a lot more than the girls...but it's a fact, although the girls are maturing physically quicker, the boys are more active at this school.*

*(Male HoPE; 3.5 years teaching experience; School A; 2004)*

With respect to age, it was reported by some HoPEs that there was more enthusiasm from the younger age groups than the older ones. For example, one HoPE stated:

*Probably a little more enthusiasm from the younger age groups, years seven, eight and nine. Years ten and eleven, it's not really cool to have things recorded about them and put on display. Generally speaking, the younger students are more enthusiastic about recording.*

*(Male HoPE; 17 years teaching experience; School H; 2004)*

### **5.2.7 Conceptual Confusion**

It was apparent from the interview data that there was some degree of conceptual confusion with respect to the meanings of and relationships between health, physical activity and fitness. Some HoPEs used the terms interchangeably and thought that pupils' health, physical activity levels and fitness were all closely inter-linked. For example, when asked how he used the fitness testing information, one HoPE responded:

*If you can give them information on how fit they are, and the effects of fitness on their health, then they're more apt to take part in activity when they leave school.*

*(Male HoPE; 4 years teaching experience; School D; 2004)*

He went on to explain:

*Because the more active the children are, the better their fitness level is going to be.*

*(Male HoPE; 4 years teaching experience; School D; 2004)*

Clearly, this HoPE believed that fitness levels in children are closely related to health and that physical activity levels are related to fitness.

Similar confusion between health, physical activity and fitness was evident in several other interviews, for example it was commented:

*I think pupils need to be aware that fitness and their own fitness for their health is important.*

*(Male HoPE; 15 years teaching experience; School I; 2004)*

*It's about adopting a positive attitude about participating in physical activity to maintain a good level of fitness...*

*(Male HoPE; 20 years teaching experience; School L; 2004)*

Another HoPE illustrated limited understanding of fitness generally by stating the following:

*If they've got a really good fitness level, we might tell them to get into football or rugby, etc. Or if they've got poor or low scores we might say that gymnastics is better for you. Just try and push them in the right direction for the sport that fits their fitness levels.*

*(Male HoPE; 3.5 years teaching experience; School A; 2004)*

### **5.2.8 Teacher Resources and Support**

The HoPEs who were interviewed generally felt that there was insufficient guidance

available on monitoring children's health, physical activity and fitness. They considered that they needed more formal guidance to raise the status of monitoring, give it more credibility and ensure consistency across schools. They also felt they needed guidance on how to incorporate monitoring into the curriculum and how to relate it to National Curriculum requirements. Some HoPEs reported that they had created their own booklets, used text books, and surfed on the internet for relevant websites, but still felt that they needed more and clearer guidance. Comments included:

*I have created a booklet by myself...I want to do it as practically as I can, rather than go too much into the technical aspect of it.*

*(Female HoPE; 34 years teaching experience; School C; 2004)*

*I bought Jo Harris's book, that's given us a structure but I think we need more clear guidance, a bigger National Curriculum focus... I think it would be better if it were and I think we need more formal guidance, some sort of national programme to raise the issues to a higher level and give it more status, more credibility, but with a common structure across all the schools. I think that would help.*

*(Male HoPE; 23 years teaching experience; School K; 2004)*

When asked if they had received any in-service training or continuing professional development, nearly all of the HoPEs answered 'no' but one stated:

*No as such. Many years ago I did a course at ... University. Fitness testing within the curriculum was part of that course. But it was twelve years ago,*

*maybe longer.*

*(Male HoPE; 28 years teaching experience; School B; 2004)*

### **5.2.9 Limitations and Issues**

Whilst most HoPEs interviewed expressed that, ideally, schools should monitor pupils' health, physical activity and fitness, they identified a number of limitations, constraints and issues associated with this. For example, and as noted earlier, they questioned who should take responsibility for monitoring and in addition, mentioned timetabling, financial and resource constraints. Some considered that monitoring should be made a government requirement in order for teachers to implement it. On the issue of resource and time constraints, HoPEs stated the following:

*Who would do it? Monitoring it and recording it is very much an administrative job. If we had a department secretary or a department technician, then it is something we would do.*

*(Female HoPE; 34 years teaching experience; School C; 2004)*

*In an ideal world, if I had more time. At the moment, I'm just doing fitness testing for them. It would be interesting to collate that information and look at it but in a real world, until there's less demands on us...it's something I'd be interested to see.*

*(Female HoPE; 12 years teaching experience; School E; 2004)*

Finally, meeting National Curriculum requirements was viewed as a constraint to monitoring by the following HoPEs:

*I think although there is a degree of flexibility with the National Curriculum, most schools find it very difficult to fit everything in. So some things get pushed to the side...and we've got to cover the National Curriculum. We've got to do this, got to do that... we can't do it all, and that's the problem.*

*(Female HoPE; 34 years teaching experience; School C; 2004)*

*Schools really just reflect what government guidelines are given. So I think schools have their hands tied somewhat. Although they should really have the confidence to have a bit more flexibility in their approach.*

*(Male HoPE; 20 years teaching experience; School L; 2004)*

### **5.2.10 Summary**

This chapter has summarised HoPEs' views of, and attitudes towards, monitoring health, physical activity and fitness, as expressed through the interviews. HoPEs valued monitoring, believing that it provides a benchmark or baseline from which pupils could improve, develops pupils' knowledge and understanding and promotes their health and physical activity. Most HoPEs expressed concerns about pupils' state of health and low levels of physical activity and fitness. However, most considered that it was not just the responsibility of PE teachers to monitor health, physical activity and fitness but also that of the entire school, parents and society. Some HoPEs used the terms health, physical activity and fitness interchangeably and demonstrated some confusion about the relationship between these concepts. Most HoPEs considered it desirable to monitor physical activity and physical fitness within the PE curriculum, however, insufficient time was viewed as one of the major barriers to this. They also requested that formal guidance on monitoring be provided to raise the status of, and provide teachers with, more assistance with, monitoring health,



physical activity and fitness within the secondary school curriculum.

## **Chapter 6: Discussion and Recommendations**

The findings have provided an overview of the monitoring of pupils' health, physical activity and fitness within the secondary school curriculum in England and have revealed variations in teachers' monitoring practice and views about monitoring. A number of issues, some systemic weaknesses and implementation constraints, have also been identified. This chapter examines and discusses the survey and interview findings from the following perspectives which are related to the research questions and the themes emerging from the analysis:

- (1) The prevalence of monitoring health, physical activity and fitness
- (2) Factors influencing the nature of monitoring in school PE
- (3) Pupils' responses and attitudes towards monitoring
- (4) Teaching models and approaches employed
- (5) Recommendations
- (6) Research limitations
- (7) The application of this research to the Taiwanese context.

### **6.1 The Prevalence of Monitoring Health, Physical Activity and Fitness**

#### **6.1.1 Health Monitoring within the School PE Curriculum**

The findings revealed that over sixty per cent of secondary schools did not include any form of health monitoring within the PE curriculum. However, this may not be surprising given the fact that monitoring health is not an explicit requirement in the NCPE and that the main reasons HoPEs stated for not monitoring health were time and workload constraints and limited knowledge. These findings could be said to reflect Harris's (1997) conclusion that the promotion of health within the secondary PE curriculum was not well understood.

Interestingly though, the low prevalence of health monitoring did not seem to be due to a lack of interest. Over half of the HoPEs agreed that it should be an important or even mandatory component of any PE programme. Most HoPEs had also given some consideration to the purpose of health monitoring, such as increasing awareness of the importance of a healthy lifestyle and the early detection of health problems.

The findings also revealed that those HoPEs who stated that they were monitoring health within the school PE curriculum were mostly monitoring health-related fitness components by means of fitness tests. For example, the most frequently cited aspects of health that were monitored were cardiovascular health, weight, height, and body composition. Whilst it is accepted that monitoring clinical health measures (such as cholesterol levels, blood profiles and bone mass) within the school setting is unrealistic due to resource limitations and ethical considerations (Ewles & Simnett, 1999), it may be possible to broaden the health focus by involving pupils in completing a health behaviour or lifestyle questionnaire which includes questions about physical activity, dietary habits, smoking and psychological well-being. This would potentially improve pupils' knowledge and understanding of the influences on health, and encourage them to engage in a healthy lifestyle.

### **6.1.2 Physical Activity Monitoring within the School PE Curriculum**

Just over sixty per cent of schools were involved in physical activity monitoring which is a much higher percentage than that for health monitoring. A wide variety of monitoring methods were utilised by the HoPEs ranging from registers, observations, questionnaires, heart rate monitors and diaries. These methods are considered by Cale (1998), Cale and Harris (2005c) and Welk and Wood (2000) to be appropriate for use with young people in schools and to have educational value and be easy to use.

This study therefore demonstrated a degree of confidence amongst HoPEs with

respect to physical activity monitoring and methods to do this. Most HoPEs interviewed stated that the purpose of monitoring was to promote lifelong physical activity, to identify pupils' physical activity needs and to monitor their physical activity progress. This links with one of the main goals of physical education which is to achieve a positive life-time effect on children's involvement in a healthy, active lifestyle (Almond, 1996; Cale, 2000; Naylor & McKay, 2009; Pate & O'Neill, 2009).

In this study, whilst over three quarters of HoPEs disagreed that monitoring young people's physical activity is a 'waste of time', a similar proportion thought that it was problematic within the school curriculum. Furthermore, nearly sixty per cent of HoPEs considered that promoting and monitoring physical activity was more important than fitness within the curriculum. However, their main reasons for not monitoring physical activity were insufficient time and resources. This implies that if they had time and resources, these HoPEs would include physical activity monitoring in their curriculum. It has been argued that the allocation of the majority of PE curriculum time to the delivery of traditional invasion games such as football, rugby, netball, and hockey takes the focus and time away from learning about knowledge and understanding associated with healthy, active lifestyles, and developing positive attitudes towards physical activity (Penney & Evans, 1999). Furthermore, as Welk and Wood (2000) and Cale and Harris (2005) note, if young people's physical activity promotion is, as they believe, an appropriate behavioural target for physical education, more emphasis should be placed on monitoring physical activity within the curriculum.

While attention in physical education has increasingly focused on the promotion of physical activity (Fairclough et al., 2002; Fox et al., 2004; McBride & Midford, 1999b; Sallis & Owen, 1999), a number of issues and constraints have led to some HoPEs not monitoring physical activity. Such issues and constraints are discussed in a

later section of this chapter.

### **6.1.3 Fitness Monitoring within the School PE Curriculum**

Fitness monitoring was more widely practised by the HoPEs than health or physical activity monitoring, with nearly ninety per cent of the HoPEs including fitness testing in the PE curriculum. This result concurs with Harris's (1995) findings that fitness testing is commonplace within the PE curriculum of secondary schools in England. The high prevalence of fitness testing may be due to some of the reasons proposed by Cale & Harris (2005a), such as a response to concerns over young people's health and physical fitness and references to fitness within the National Curriculum for Physical Education (NCPE).

The findings furthermore revealed that the scope of the fitness monitoring included a range of traditional fitness tests associated with aerobic capacity, muscular strength/endurance, flexibility, speed, agility, balance, coordination, power, and reaction time. The most frequently cited fitness test was the Multi-Stage Fitness Test which is not considered to be particularly suitable for children (Cale & Harris, 2005b). Some HoPEs also identified that the Multi-Stage Fitness Test discouraged some pupils and led to them attempting evasion of fitness testing. It has indeed been highlighted how some tests can be threatening, uncomfortable, demeaning, and embarrassing for some children who are less active (Cale & Harris, 2009b; Corbin et al., 1995; Harris & Elbourn, 1994; Rowland, 1995). It is interesting that, despite recognition of the problems, many HoPEs continue to use this test.

Most HoPEs believed that fitness test results could inform pupils about their fitness status and progress and that the fitness testing would help pupils to become more physically active. However, the relationship between fitness and physical activity among children is low (Armstrong & Fawkner, 2007; Armstrong & Welsman, 1997d;

Boreham & Riddoch, 2001; Rizzo et al., 2006) and Corbin & Lindsey (2002) have pointed out that children's physical activity levels cannot be judged from their fitness. Indeed, there is little or no evidence that improvements in fitness scores lead to improvements in health or in health-related behaviour (e.g. becoming more active) (Freedson et al., 2000; Harris, 2000; PEA UK, 1998). Further, it should not be assumed that fitness testing will automatically increase pupils' physical activity levels or develop pupils' understanding of both fitness and physical activity (Corbin et al., 1995; Keating, 2003; McKenzie & Kahan, 2004). Fitness testing has the potential to promote physical activity, improve health-related fitness and promote positive attitudes in children, but that should be in the context of a comprehensive physical education curriculum (Cale & Harris, 2005a, 2006, 2009b; Cavill et al., 2001; Corbin, 2002; Pangrazi, 2000)

Some HoPEs utilised fitness testing results to grade or reward pupils. However, factors such as the environment (e.g. temperature, humidity), lifestyle (e.g. exercise, nutrition), test protocol/procedures, motivation, skill, maturity and heredity or genetic potential can all influence pupils' fitness tests performance (Bouchard et al., 1994; Cale & Harris, 2009b; Fox & Biddle, 1986; Pangrazi, 2000). All of this means that, if the purpose of fitness monitoring is to improve pupils' activity levels and educate them about fitness and activity, then fitness monitoring should only be used as a tool within the context of a fitness education programme to reach educational goals (Silverman et al., 2008). One HoPE expressed that he did not think pupils understood the purpose of fitness testing. Teachers should help pupils to understand the methods by which fitness can be assessed, the factors affecting tests, and the meaning of fitness test results.

Over a decade ago, there was a particular debate about fitness testing in schools (Corbin, Pangrazi, & Welk, 1995; Rowland, 1995). The debate focused on whether

the "horse" of fitness testing in schools was dead and it was suggested that perhaps the PE profession should "dismount the horse" if it was. Today, well over ten years later, it seems the "horse" is still not dead and the debate continues (Cale et al., 2007; Corbin et al., 2007; Fox, 2007; Liu, 2008; Morrow, 2007; Plowman, 2007; Rowland, 2007). The findings of this study reveal that fitness testing remains commonplace in the school PE curriculum in England despite it being a controversial practice.

More recent developments in monitoring have seen a shift away from a focus on fitness to a focus on lifestyle behaviours due to increasing knowledge about the benefits of physical activity, and growing awareness of the physical activity required to bring about health benefits (Cale & Harris, 2006). This study indicated that most physical education programmes have continued to emphasise fitness testing as the primary form of monitoring, and half of HoPEs did not agree that too much time was spent on monitoring young people's fitness. Further, none of the HoPEs specifically stated that they were aiming to develop pupils' knowledge and understanding of fitness via fitness testing which would suggest that it might be time to "dismount the horse" of testing as, in some schools, it seems that it is being used in isolation without a clear educational purpose (Silverman et al., 2008).

To move fitness testing in schools forward in ways suggested by Cale and Harris (2005, 2009), it would seem that teachers require additional training, support and resources, as requested by teachers in this study. Only then may it be possible to see a *transformation of fitness monitoring in schools and more time being invested in health and physical activity promotion.*

#### **6.1.4 HoPEs' Concerns about Pupils' Health, Physical Activity and Fitness**

The survey and interview findings revealed widespread concerns amongst HoPEs about children's unhealthy and inactive lifestyles and lack of fitness. These concerns

resonate with evidence of pediatric health problems such as increasing body fatness amongst children and adolescents (HEA, 1998b) and low levels of physical activity amongst some young people (Cale & Harris, 2005c; Rowland, 2002). Indeed, the most recent Health Survey for England (Craig & Mindell, 2007) found that many young people are inactive and a sizeable proportion do not meet physical activity recommendations (i.e. they do not engage in physical activity of at least moderate intensity for one hour a day, as recommended by the HEA (1998a)). The HoPEs in this study recognised that more needs to be done within school PE to promote healthy, active lifestyles, and most agreed that PE can develop pupils' knowledge and understanding about health and the importance of a healthy, active lifestyle. However, most HoPEs chose to dedicate some PE curriculum time to fitness testing rather than to health and physical activity monitoring, possibly as a consequence of concerns about children's low and/or deteriorating fitness levels, and the teachers' limited understanding of the relationship between fitness, physical activity and health. Many HoPEs thought that fitness testing could be effective in promoting physical activity and believed pupils' physical activity behaviour and levels could be improved through the process of fitness testing. This possibly explains why, given the HoPEs' concerns about pupils' health and physical activity, they focused much of their attention on fitness.

In addition to the analysis above, monitoring within the school curriculum appears to be limited by a number of factors which are discussed in the next section.

## **6.2 Factors Influencing the Nature of Monitoring in the PE Curriculum**

The HoPEs considered that a number of factors influenced their decisions about monitoring pupils' health, physical activity and/or fitness within the school curriculum. These factors included the value placed on monitoring and issues



associated with responsibility, time/workload, and resources. There was also some confusion about the purpose of and the methods involved in monitoring. Each of these factors is discussed in the following sections.

### **6.2.1 The Value of Monitoring**

As the literature indicates, the value of monitoring health, physical activity and fitness within the school curriculum is to promote valuable cognitive and affective learning in the PE curriculum as well as to promote active, healthy lifestyles (Cale & Harris, 2002, 2009b; Corbin, 2002; Harris & Cale, 1997; Lopes et al., 2007; Pangrazi, 2000). Most HoPEs in this study agreed that monitoring young people's physical activity is not a 'waste of time', and stated a variety of purposes for and value of monitoring including: to see how fit and healthy pupils are; to provide a baseline benchmark for target-setting, rewarding and scoring; to inform parents of their children's progress; to discover talented/gifted children; and to encourage pupil involvement in physical activity. Noticeably, only a small percentage of the HoPEs recognised increasing pupils' knowledge and understanding of health, physical activity and fitness as a key reason for implementing monitoring procedures. One HoPE even expressed that he did not see the value of physical activity monitoring within the school curriculum. These findings concur with those of Pate (1991) and Keating (2003) who consider that the acquisition of knowledge and understanding is usually given limited attention and is often overshadowed by fitness testing programmes. Corbin (2002) warns that some uses of monitoring, such as to grade pupils as an indicator of achievement in PE and/or as a criteria for rewards, could potentially have negative consequences such as loss of interest in PE or physical activity, teaching to the test, cheating on tests, or undermining the confidence of those students who do not meet teacher expectations (Corbin & Lindsey, 2002; Corbin et al., 1995). These in turn are likely to be

counter-productive in encouraging lifetime participation in physical activity (ACSM, 1988; PEA UK, 1988). Some HoPEs indeed recognised how monitoring could be a negative experience for those pupils who are inactive, unfit, overweight and/or not good at sport. However, as one key goal of physical education is to help youth to establish lifelong patterns of physical activity (Pate, 1994), it would seem important and relevant to increase the value of physical activity monitoring within the PE curriculum. It should be expected that through the monitoring process, pupils can learn to appreciate the importance of participation in physical activity, and to become aware of their own physical activity levels. Furthermore, and in keeping with the ecological model (see Chapter 2, section 2.9.3), pupils can learn about the opportunities or means by which they can increase their own physical activity levels, and the barriers or issues that hinder them from being physically active, within and beyond the school setting.

Schools have the potential to promote safe, enjoyable and lifelong physical activity. Teachers should recognise the importance and value of monitoring pupils' health, physical activity and fitness, and implement monitoring in a variety of ways, not relying solely on the administration of tests. For example, assessment of 'knowledge and understanding', and 'behavioural skills' could be incorporated into the PE curriculum.

### **6.2.2 Ambiguity in Responsibility and Accountability**

Young people spend nearly half of their waking hours in school (Fox et al., 2004; Stratton et al., 2008), and schools have organisational structures and facilities, trained personnel, opportunities to interact with the community, and can reach most pupils (Pate et al., 2000; Stratton et al., 2008). As a consequence, schools can be viewed as ideal contexts for helping pupils develop knowledge, understanding, physical

competence, behavioural skills, and positive attitudes towards physical activity (Armstrong & McManus, 1994; Cale, 1998; Harris, 2000; MMWR, 1997). In this study, although most HoPEs expressed concerns about pupils' health, fitness and physical activity levels, and believed monitoring to be important, many were unclear about who should be responsible or held accountable for children's health, physical activity and fitness. Nearly a quarter of the HoPEs did not agree that it was schools' responsibility to monitor pupils' health and physical activity. It therefore seems that there is some ambiguity amongst HoPEs with respect to who should be held responsible for children's health, activity and fitness status. Some of them considered that parents were partly responsible for monitoring their children's physical activity as children spend only a limited amount of time at school. Some also considered that schools and society as a whole should take responsibility for monitoring physical activity. Armstrong and McManus (1994), Cale & Harris (2005) and MMWR (1997) support the view that schools should adopt a 'whole school approach' to the promotion of safe, enjoyable and lifelong physical activity for young people. Whilst Cale (1997) recognizes the curriculum as a vitally important vehicle for the promotion of physical activity, at the same time she recognizes that it is only one aspect of the school that can influence children's physical activity levels. Cale (1997) notes how, for physical activity to be truly effective and lead to sustainable behaviour change, a whole school approach should be considered. Indeed, researchers have found whole-school approaches encompassing the curriculum, policy, and environmental strategies for increasing physical activity to be more effective than curriculum-only approaches (Timperio et al., 2004). The same is likely to be the case for health, physical activity and fitness monitoring in that it is likely to be more effective if the whole school and whole school population (including PE teachers,

teachers of other subjects, pupils, parents and governors) are involved in and support such monitoring.

Interestingly, most HoPEs viewed health and physical activity monitoring as problematic and an extra task, yet nearly ninety per cent of them implemented fitness testing with few or no complaints. This may be a consequence of the fact that concerns over young people's fitness have attracted a good deal of attention in recent years, including from the media, which consistently portray the view that children are unfit and unhealthy (Cale & Harris, 2005a). According to Cale & Harris (2005a), teachers may therefore feel compelled and even duty-bound to respond to public concerns by focusing on and measuring young people's physical fitness. It may also be the case that fitness testing is an established and familiar method of monitoring in comparison with health and physical activity monitoring. Consequently, there is more guidance and peer support available for fitness testing than for monitoring health and physical activity. It may also be true that HoPEs are themselves products of 'fitness testing', since they no doubt were tested during their childhood and possibly during their training and, through these experiences, would have become familiar with the procedures involved. Indeed, it could perhaps be argued that subconscious unwillingness or natural fear-of-change could best describe some HoPEs' reactions to health and physical activity monitoring. Sparkes (1990) indicated that, when facing a new innovation, change or challenge, teachers tend to adjust to the change by adjusting as little as possible because innovation and change are sources of stress. Psychologically, more familiar work can be perceived as less stressful than accepting and adjusting to new changes. This resistance to change could be seen as human, as change introduces uncertainty, disrupts routines, and creates fear of the unknown (Perren, 1996). Indeed, as Machiavelli (1532) puts it:

There is nothing more difficult to take in hand, more perilous to conduct or more uncertain in its success, than to take the lead in the introduction of a new order of things.

However, the resistance could also be due to the HoPEs' limited understanding and confusion with respect to health, physical activity and fitness concepts, the relationships between these concepts, and appropriate methods for monitoring each. These points are revisited again later in this chapter.

### **6.2.3 Time Constraints**

Even though fitness testing was found to be the most common method of monitoring in schools, most male and some female HoPEs considered that even more time should be spent on it within the school curriculum. This suggests that the popularity of fitness testing within the school PE curriculum continues and has not changed over time, reflecting the findings of Harris (1995), Cale (2000), and Ross and colleagues (1985). However, it has been suggested that fitness testing should not be a major part of or dominate the PE curriculum (Cale & Harris, 2002; Pate, 1994) and that, if included at all, it should help to achieve the goal of promoting a physically active lifestyle and maintaining good health throughout life (Pate, 1994) by 'turning children on to' physical activity (Corbin et al., 1994). The findings reveal that, despite the numerous limitations of fitness testing that have been reported in the literature (e.g. Cale & Harris, 2005b; Rice & Howell, 2000; Rowland, 1995; Safrit, 1990), many HoPEs continue to utilise traditional fitness testing methods and procedures. This very issue was debated by Cale, Harris & Chen (2007) who concluded that there was little evidence to support the notion that fitness tests promote physical activity. Indeed, much fitness testing in PE may therefore represent a misdirected effort in the

promotion of healthy lifestyles and physical activity (Cale & Harris, 2009b). In turn, this raises serious questions as to why so much time and attention is spent on fitness testing. Indeed, Harris (2000) expressed the view that curriculum time spent on fitness testing may detract from the time devoted to promoting physical activity and developing knowledge and understanding about health. As a consequence, it is suggested that PE time could and should be better spent (Cale & Harris, 2005a). It seems that some teachers may need to be helped to consider how PE time might be used more constructively to effectively promote healthy, active lifestyles; in other words, to place emphasis on the 'process' of physical activity rather than on the 'product' of fitness.

Another consideration with respect to the use of PE time is the breadth and balance of the curriculum. Evidence suggests that team sports dominate English PE curricula (Fairclough et al., 2002; Sport England, 2001), yet bear limited relation to the activities that young people participate in out of school and into adulthood. In order to promote life-long physical activity, it is considered that a broader base of PE activities needs to be offered to reinforce the fact that it is not necessary for young people to be talented sports people to be active and healthy. PE could make a more significant contribution to pupils' regular physical activity participation if lessons are planned and delivered with physical activity promotion goals in mind (Fairclough & Stratton, 2005).

#### **6.2.4 HoPEs' Misconceptions**

"Teaching is about knowing..." (Harrington, 1994, p. 191). It has been acknowledged that "teachers have a knowledge of teaching far more complex than subject matter knowledge or knowledge of teaching techniques" (Beattie, 1995, p.58). A teacher's practice is not just an expression of his or her own professional knowledge that is

informed by his/her professional background, experience and perceptions, but it is also one that is shaped by personal attitudes, beliefs, and goals. Understanding how teachers' "beliefs influence their teaching is critical to teachers' development and change in role, conceptions and teaching practices" (Tatto, 1998, p. 66). The findings from this study revealed conceptual confusion amongst the HoPEs with respect to the definitions of and interrelationships between health, physical activity and fitness. Furthermore, it seems that some teachers may have allowed their judgments about monitoring to be skewed by their emotional unwillingness towards change, or they adjusted to the change by changing as little as possible because, as mentioned earlier, innovation and change are sources of stress (Sparkes, 1990). The fact that conceptual confusion was evident amongst the HoPEs, irrespective of their gender or length of teaching experience (Table 4.13), furthermore suggests that it may be widespread across HoPEs of all ages, including recently qualified teachers. Thus, it is suggested that initial teacher education programmes and continuing professional development should address issues associated with monitoring pupils' health, physical activity and fitness within the PE curriculum.

#### **6.2.4.1 Limited Understanding of the Relationship between Fitness, Physical Activity and Health**

The findings from the interviews in particular revealed that few HoPEs fully understood or acknowledged the inter-relationships between health, physical activity and fitness. For example, some HoPEs often used the terms interchangeably and showed little understanding of the differences between the concepts and how these might be monitored. Over three quarters of the HoPEs believed that fitness testing could promote physical activity and health and that any additional monitoring procedures were unnecessary. This concurs with the literature which points out that it

is often assumed that fitness test results reflect the amount of physical activity undertaken and that those who score highly on fitness tests are more active (Pangrazi, 2000). However, as noted previously, the relationship between young people's fitness and physical activity is low (Armstrong and Fawkner, 2007; Corbin and Lindsey, 2002; Boreham and Riddoch, 2001), and physical activity levels cannot be judged from fitness scores (Corbin, 2002). Furthermore, there is currently little or no evidence that young people who improve their fitness test scores also improve their overall health or health-related behaviours (e.g. becoming more active) (Freedson et al., 2000; PEA, 1988; Rizzo et al., 2006).

Thus, it should not be assumed that fitness testing will automatically increase young people's physical activity levels. To the contrary, it is possible that a negative fitness testing experience may reduce young people's desire to be active. Thus, until there is more evidence to support the relationship between childhood fitness test scores and children's general health, more attention should be paid to understanding young people's patterns of, and attitudes towards physical activity (Cale & Harris, 2002),

It is, however, perhaps understandable that HoPEs might be confused about the relationship between health, physical activity and fitness, especially as evidence has emerged from the European Youth Heart Study (EYHS) that there may be associations between physical fitness and CVD risk factors in children (Poortvliet, 2003). Clearly, this is a complex and equivocal area and, as a result, it may be that HoPEs simply continue with fitness testing as it is a familiar and straightforward method of monitoring to them.

As Cale & Harris (2009) and Pate (1991) have stated, the key purpose of fitness monitoring is to promote valuable cognitive, affective and behavioural changes such as knowledge and understanding, promoting positive attitudes towards exercise and



fitness, and adopting active, healthy lifestyles. The HoPEs generally thought that fitness testing could provide a benchmark to improve from and that it would motivate pupils. Armstrong and Welsman (1997c) advised 'teachers must ask themselves why they are testing young people's fitness, and if the answer is for classification purposes, then we suggest that they would be better employed seriously addressing the problem of young people's sedentary lifestyles' (p. 257). Also, many HoPEs did not agree that fitness testing merely distinguishes the mature and motivated pupils from the less mature and de-motivated, which is contrary to Armstrong and Biddle's (1992) assertion that this is precisely what it does.

The above has led some to conclude that tests suitable for use in the school environment which provide valid and objective measures of fitness are simply not available (Armstrong, 1989; Armstrong & Welsman, 1997c). Hence, it is considered that teachers need to be aware of the limitations of fitness tests and help pupils to be aware of them also. In order to effectively promote health, physical activity and fitness, the relationships between these concepts, and monitoring methods which can be used to achieve the desired goals of promoting healthy, active lifestyles among young people should be included during pre-service and in-service education programmes. It has been recommended that incorporating health-related fitness and fitness testing in physical education teacher education or professional development programmes could better prepare teachers to meet the perceived and real challenges they face with monitoring (Bulger et al., 2001; Ferguson et al., 2007). Providers of initial teacher training and in-service education need to consider how to develop teachers' knowledge, attitudes and practice with respect to monitoring children's health, physical activity and fitness.

#### **6.2.4.2 Lack of Familiarity with Appropriate Monitoring Methods**

Another barrier to physical activity and health monitoring by the HoPEs within this study may be that they thought it was more problematic than physical fitness monitoring. Many HoPEs commented that it would be unrealistic, time and effort-wise, for them to accurately monitor children's health and physical activity and track their progress and development in this way. More than three quarters of the HoPEs considered that it was problematic to monitor young people's physical activity because it required much effort, resources (e.g. expensive, sophisticated equipment and specialist staff), and extensive evaluation and comparison to obtain meaningful benchmarking data. Furthermore, the HoPEs were concerned about the accuracy of the data gathered. However, according to the literature (Cale, 1998; Welk & Wood, 2000), a number of simple physical activity monitoring methods that are appropriate for use within the curriculum are available. Examples which are practical and useful methods to use in schools include observation, heart rate monitoring, pedometers, or self-report. The choice of physical activity monitoring instrument depends on the type of information and the level of detail that is needed. It is proposed that it is more important in an educational setting to focus on what young people learn through the process (Welk & Wood, 2000), than to be overly concerned about the accuracy of the methods used. If teachers could focus on what children learn through the process rather than on the precision and accuracy of the results, then effort and resources may not present such constraints.

#### **6.2.4.3 Not Valuing Physical Activity Monitoring**

The public health emphasis in recent years on promoting lifestyle physical activity has focused attention on this as a primary objective of physical education (Welk, 2008). Considering the importance and value of physical activity monitoring, it is somewhat surprising that the findings of this study did not reveal physical activity

monitoring to be more prevalent within the schools' physical education curricula. Furthermore, some HoPEs stated that they did not see the value of monitoring physical activity and consequently did not do so. This view may have stemmed from the historical emphasis on fitness testing or a lack of knowledge about appropriate ways of monitoring physical activity. As noted previously, some researchers, however, advocate that physical activity monitoring within the school curriculum can be used to promote pupils' physical activity and establish how active they are, and to meet the requirements of the National Curriculum (Cale & Harris, 2002; Corbin, 2002; Harris & Cale, 1997; Pangrazi, 2000).

Given that 57 per cent of HoPEs considered that promoting and monitoring physical activity was more important than promoting and monitoring fitness within the curriculum, it would seem that support is needed to improve some HoPEs' knowledge and understanding of how to monitor pupils' physical activity. Some HoPEs commented that monitoring and evaluating pupils' physical activity takes too much time out of the curriculum and limits the opportunities for pupils to be active within physical education. However, the way in which the monitoring is carried out and the educational value of the assessments for long-term physical activity promotion need also to be considered. More recently, Welk (2008) summarised the advantages of physical activity monitoring within the physical education curriculum as follows: (1) Pupils can learn a variety of ways to be physically active; (2) Pupils can determine if they are achieving recommended levels of physical activity; (3) Pupils can reflect on their physical activity experiences and identify activities that they enjoy; (4) Pupils can track their behaviour and modify their behavior to establish lifelong patterns of activity; and (5) Pupils can gain confidence and improve self-worth by reaching activity goals successfully. Reductions in the time spent being active in physical education may not always be necessary and can be justified if

monitoring helps to promote physical activity out of school, or if it builds behavioural skills that help youth to be active later in life (Welk & Morrow, 2008).

### **6.3 Pupils' Responses and Attitudes towards Fitness Testing**

A number of HoPEs within this study reported that a proportion of pupils had negative views of fitness testing. These views were more widespread amongst girls whom it was perceived were more reluctant than boys to have their performance scores publicised, especially those who were inactive, unfit, overweight and/or not as good at sports as others. This is consistent with the findings of Hopple and Graham (1995) who reported that some children view fitness tests as a painful, negative experience and even try to dodge them. Hopple and Graham's (1995) view is that fitness testing leads pupils to believe that competition and excellence are necessary conditions for health and fitness and that it reinforces some children's view that activity is competitive and unpleasant. As a result, they noted how pupils dislike fitness testing, find it competitive or boring, and are often not motivated and prepared to participate in tests. They also warned how this can carry over into future physical activity. Some HoPEs in this study were sensitive to the potential impact of negative responses to fitness testing. For example, a few HoPEs identified, in particular, that the Multistage Fitness Test discouraged some pupils as it was very demanding and led to pupils trying to evade the activity. As a consequence, these pupils may develop negative feelings towards PE through the uncomfortable and possibly painful physical and emotional experiences encountered from such tests.

Some HoPEs agreed with the statement that 'The way in which monitoring is carried out influences young people's attitudes towards their health, physical activity and fitness'. Related to this point, Rowland (1995) notes how fitness testing, if conducted inappropriately, can be demeaning, embarrassing, and uncomfortable for

children (often those for whom there is most concern). For example, pupils who are overweight might feel embarrassed if their skinfolds or weight and height are measured in front of their peers.

To make testing a more positive and meaningful experience for young people, teachers need to inform pupils about why they are testing and encourage them to learn how to administer tests, thereby giving them more responsibility and further promoting their cognitive and affective learning. Teachers should be guided to move beyond 'traditional' testing methods to more student-centered approaches to give, for example, pupils more options or a choice of tests, 'take home' tasks, and self and partner/peer (vs. whole-group) assessments. Indeed, such approaches are considered to be more effective and capable of promoting young people's self-value, self-esteem and self-respect (Corbin et al., 1995; Pate, 1994; Ratliffe & Ratliffe, 1991). In this way, the focus would be shifted towards the learning process instead of the product or end result, which would thereby help to reduce any feelings of discomfort and/or embarrassment associated with the tests.

#### **6.4 Teaching Models and Approaches Employed**

In terms of the teaching models and approaches employed when monitoring pupils' health, physical activity and fitness, the findings suggest that 'direct instruction' was the most frequently employed model adopted by the HoPEs. The teachers acted as instructional leaders focusing on pupil improvements and the provision of useful benchmark or baseline data. Comparison of pupils' test results was one of the stated purposes of assessing pupils in this study. None of the HoPEs stated that they allowed pupils to: learn how to monitor themselves; discuss the importance and purpose of monitoring; or demonstrate their knowledge and understanding of the importance of health, physical activity and fitness.

Direct instruction is a top-down and teacher-centered model in which teachers

provide pupils with information and instructions and expect them to follow and benefit from these. Direct instruction has merits as a teaching method in that it is time and resource efficient, promoting high rates of student engagement in practices and skills (Metzler, 2000), and it can also develop pupils' knowledge and understanding. However, as highlighted earlier, one HoPE admitted that his pupils were not aware of what was really going on in terms of monitoring (see Chapter 5, page 162). Direct instruction does not empower young people or give them ownership of their own learning and it is also difficult to assess pupils' understanding and knowledge of the monitoring process through this method. If teachers only employ top-down and teacher-centered models for monitoring, and use test scores as the only indicator of progress or reward, pupils will learn to focus solely on the test results rather than the process and the importance of health, physical activity and fitness.

As alluded to in the previous section, there are many other teaching models and approaches that are 'bottom-up' or learner-centered which could be more appropriately adopted when monitoring health, physical activity and fitness and which have the potential to encourage pupils to take on responsibilities, improve group relationships, develop self-esteem, enhance cognitive development, and increase pupils' ability to assume control over their own lives (Naidoo & Wills, 1998; Ewles & Simnett, 1999). Such approaches are also more in keeping with what is considered to be good pedagogical as well as physical activity promotion practice. For instance, the personalised system for instruction (PSI) could avoid comparisons being made and prevent pupils from feeling embarrassed about monitoring or wanting to avoid PE (Keller & Sherman, 1974; Metzler & Sebolt, 1994). The co-operative learning model could provide pupils with opportunities to learn how to implement monitoring independently, the peer teaching model could enhance pupils' cognitive and social development (Metzler, 2000), and the inquiry teaching model could

promote pupils' cognitive and affective learning about health, physical activity and fitness by engaging their attention and instilling positive learning attitudes (Metzler, 2000). At the same time, teachers should be encouraged to adopt and apply an educational and/or empowerment approach to their instruction. Via these approaches, young people are helped and empowered to identify what their health and physical activity needs or concerns are, respectively, and to gain the skills to make decisions and choices according to their own interests, needs and values with respect to health, physical activity and fitness. Clearly, HoPEs could benefit from learning the value and art of implementing more learner-centered teaching models and approaches to their monitoring practices, and incorporate these more readily into their teaching.

In addition and more recently, Cale and Harris (2009) have called for increased attention to be paid to the ecological approach to physical activity promotion within schools and PE. In the school setting, teachers could work within an ecological framework and explore with pupils the range of influences on their health, physical activity and fitness (e.g. peers, family, home, curriculum, and school environment). Many aspects of the school environment can either promote or inhibit pupils' health, activity and fitness and from an ecological perspective, pupils could be helped to recognise such influences and identify strategies to address them. As outlined in Chapter 2, section 2.9.3.1, the Healthy School and Active School are two whole school approaches to the promotion of pupils' health and physical activity that draw on aspects of the ecological model.

Thus, an ecological framework which would address the multiple levels of influence on health, physical activity and fitness and explore the potential of different aspects of the school to promote each would seem to be another possible way forward. For example, the influence of the PE curriculum, out-of-school hours learning opportunities, the school environment (e.g. facilities, equipment) (Waring et al., 2007),

school ethos and policies (e.g. rewards, recognition), would all be considered.

## **6.5 Recommendations**

Recommendations are proposed relating to monitoring pupils' health, physical activity and fitness within the school PE curriculum based on the findings of this study and the related literature. The recommendations include:

- (1) Physical educators should broaden their approach to monitoring beyond a focus on fitness to encompass health and physical activity monitoring.
- (2) Formal guidance on monitoring pupils' health, physical activity and fitness within the school curriculum should be produced to address teachers' conceptual confusion and misconceptions, and to provide them with a range of practical ideas as to how to effectively implement monitoring within the PE curriculum.
- (3) Monitoring pupils' health, physical activity and fitness within the PE curriculum should feature within teachers' initial teacher education and continuing professional development opportunities should be provided in this area.
- (4) PE teachers should be encouraged to employ simple, manageable and appropriate monitoring methods with pupils and be helped to realise that accurate instruments, precise recording, and elaborate data analysis are not essential in an educational setting.
- (5) An adequate amount of time should be allocated to teaching pupils about the health benefits of physical activity and promoting physical activity through monitoring processes.
- (6) PE teachers should be helped to realise that the processes of monitoring health, physical activity and fitness should include development and assessment of pupils' knowledge and understanding, competence and motor skills, behavioural skills and attitudes and confidence.



- (7) When monitoring health, physical activity and fitness, teachers should be made aware that it is unnecessary to make comparisons between pupils or against standardized norms, and that by doing so, this may cause pupils discomfort or embarrassment.
- (8) PE teachers should aim to personalise monitoring procedures and ensure that pupils' experiences of monitoring are positive and meaningful, and that through them, they learn to value healthy, active lifestyles.
- (9) When teaching pupils about different monitoring methods, teachers should be encouraged to adopt different and more learner-centred teaching approaches and models which involve children in self-monitoring and target-setting to develop their independence and self-management skills.

### **6.5.1 Formal Guidance**

It seems that most HoPEs in this study recognised the importance and value of monitoring health and physical activity but for various reasons resisted implementing this within the PE curriculum. HoPEs also requested formal guidance on monitoring to raise its status, and to provide teachers with more assistance with monitoring health, physical activity and fitness within the secondary school PE curriculum.

Hence, to ensure the effectiveness of the deployment of any new policy, change, or innovation - in this case, new and different ways of monitoring pupils' health, physical activity and fitness in order to promote healthy, active lifestyles - it seems that teachers need to be provided with adequate guidance and support in how to embrace and incorporate monitoring. In essence, it is hoped that such guidance will act as a catalyst in changing teachers' monitoring practices.

Any such guidance should provide PE teachers with clear recommendations about monitoring health, physical activity and fitness within the curriculum, including a

range of appropriate, manageable and realistic practical examples. As one of the main and frequently cited goals of PE is to achieve a life-time effect on children's attitudes towards an active and healthy lifestyle, the guidance should also help to raise the status of health, physical activity and fitness monitoring within the curriculum, help teachers to overcome perceived barriers to monitoring, and steer themes towards allocating and spending an appropriate amount of time on. By so doing, it is hoped that children will develop knowledge, understanding of and positive attitudes towards this area which will encourage their engagement in healthy, active lifestyles.

Furthermore, the intention is that such guidance be used flexibly to provide PE teachers with a number of ways of monitoring to suit schools' varying resources and contexts and to accommodate different levels of pupils' knowledge and understanding. This should involve helping pupils to become aware of the range of influences on their health, physical activity and fitness and implementing and/or proposing strategies within and beyond the curriculum and school which take account of these. This should help to reduce or eliminate teachers' concerns about monitoring health and physical activity and might help them to re-think their approaches to, and strategies for promoting healthy, active lifestyles.

Taking the results of this study and the recommendations into account, guidance is presented in Table 6.1 for PE teachers on the range of content to cover in relation to monitoring children's health, physical activity and fitness. The key points to note in considering this are that:

- (1) PE teachers should broaden monitoring beyond fitness to encompass health and physical activity monitoring. Fitness testing is not omitted from the guidance, but the focus is broadened to develop knowledge and understanding, competence and motor skills, behavioural skills and attitudes and confidence. Accurate instruments, precise recording, and elaborate data collection and analysis are not essential but

instead, simple, manageable and appropriate monitoring methods are encouraged. Any discomfort or embarrassment associated with class ranking or making peer comparisons should be avoided, and pupils' experiences should be positive.

- (2) An adequate amount of time should be allocated to teaching children about the health benefits of physical activity and promoting physical activity. This should include monitoring methods involving self-monitoring and target setting to develop pupils' independence and self-management skills. Teachers should give pupils opportunities to take responsibility for implementing monitoring procedures.

The guidance in Table 6.1 incorporates links with the health-related aspects of physical education, as well as with the relevant aspects of science and personal, social and health education within the NCPE. The guidance covers: (1) Models and Approaches: to implementing health, physical activity and fitness monitoring within the PE curriculum using a range of approaches/models (2) Instruments/Methods: highlighting a combination of instruments which could be appropriately employed to monitor pupils' health, physical activity and fitness including self-report questionnaires, activity diaries, observation sheets and registers and (3) Curriculum Delivery: suggestions for teachers for developing pupils' knowledge, understanding, confidence and competence in this area.

Importantly, the guidance furthermore includes examples of learning outcomes which it is recommended Key Stage 3 pupils (11-14 year olds) should achieve with respect to the development of their knowledge and understanding, competence and motor skills, behavioral skills, and attitudes and confidence associated with health, physical activity and fitness. These learning outcomes have been partly adopted from 'Health-Related Exercise in the National Curriculum Key Stages 1 to 4' (Harris, 2000). Those which have, are highlighted with a (\*) mark.

Table 6.1 Proposed Content of Formal Guidance for Monitoring Young People's Health, Physical Activity and Physical Fitness

<b>Guidance for Monitoring Young People's Health, Physical Activity and Physical Fitness in Secondary Schools (11-14 years)</b>		
This guidance incorporates links with the health-related aspects of physical education, as well as with the relevant aspects of science and personal, social and health education.		
<b>Models &amp; Approaches</b>	<b>Instruments/Methods</b>	<b>Curriculum Delivery</b>
<p><b>Monitoring should include a range of teaching approaches/models:</b></p> <ol style="list-style-type: none"> <li>1. Peer teaching model</li> <li>2. Inquiry teaching model</li> <li>3. Empowerment approach</li> <li>4. Educational approach</li> <li>5. Ecological model</li> </ol> <p><b>Monitoring should involve pupils in:</b></p> <ol style="list-style-type: none"> <li>1. Giving responses to focused questions (pupils-teacher or pupil-pupil)</li> <li>2. Giving responses to practical tasks</li> <li>3. Performing practical tasks</li> <li>4. Taking responsibility for their actions within and outside lessons</li> <li>5. Attending, participating, and committing in physical education lessons</li> <li>6. Participating in physical activity inside and outside school</li> <li>7. Self-monitoring to develop their independence and self- management skills</li> </ol>	<p><b>Monitoring instruments/methods can include a combination of:</b></p> <p>Self-report methods such as health, lifestyle and physical activity questionnaires, activity diaries, observation sheets, registers</p>	<ol style="list-style-type: none"> <li>1. Teacher introduces topic for each class and gives pupils time to work on and discuss it.</li> <li>2. Teacher gives feedback to help pupils evaluate their behaviours and performance (as applicable).</li> <li>3. Teacher answers pupils' enquiries related to the topic.</li> <li>4. Pupils are encouraged to work on the topic in and beyond the school.</li> <li>5. Comparisons between pupils and rewarding pupils' performance should be avoided. The emphasis should be on personal behaviour/performance and progress</li> </ol>

## Learning Outcomes (11-14 years)

Below are learning outcomes associated with the development of young people's health, physical activity and physical fitness that relate to National Curriculum requirements. The learning outcomes have been placed into three categories: health, physical activity and physical fitness, and represent the proposed range of content PE teachers should aim to progressively cover with respect to monitoring health, physical activity and physical fitness within the curriculum.

Health	Physical Activity	Physical Fitness
<p><b>Knowledge and Understanding</b></p> <p><b>A. Energy Balance</b></p> <ol style="list-style-type: none"> <li>1. Know that being active helps maintain a healthy body weight</li> <li>2. Know and understand that increasing physical activity levels and eating a balanced diet can help maintain a healthy body weight but that the body needs a minimum daily energy intake to function properly</li> <li>3. Know and understand that strict dieting and excessive exercising can damage one's health</li> </ol> <p><b>B. Health Benefits</b></p> <ol style="list-style-type: none"> <li>*1. Know and understand a range of</li> </ol>	<p><b>Knowledge and Understanding</b></p> <p><b>A. Warming up and Cooling Down</b></p> <ol style="list-style-type: none"> <li>1. Understand the value of preparing for and recovering from physical activity and the possible consequences of not doing so</li> </ol> <p><b>B. Physical Activity Promotion</b></p> <ol style="list-style-type: none"> <li>1. Know that individuals have different feelings about the types and amounts of exercise they choose to do</li> <li>2. Be aware of their current physical activity levels</li> <li>*3. Understand a range of short-term effects of exercise on the body systems:               <ul style="list-style-type: none"> <li>*(a) Cardiovascular system (e.g. changes in breathing and heart rate, temperature, appearance, feelings, recovery rate)</li> <li>*(b) Musculo-skeletal system (e.g. increases in muscular strength, endurance and flexibility; improved muscle tone)</li> </ul> </li> </ol>	<p><b>Knowledge and Understanding</b></p> <p><b>A. Fitness Monitoring</b></p> <ol style="list-style-type: none"> <li>1. Know and understand different methods of fitness monitoring, as well as:           <ul style="list-style-type: none"> <li>(a) The factors influencing fitness and fitness testing scores</li> <li>(b) The relationship between health, physical activity and fitness</li> </ul> </li> </ol> <p><b>B. Components of Fitness</b></p> <ol style="list-style-type: none"> <li>*1. Understand the short-term effects of exercise on the musculo-skeletal system           <ul style="list-style-type: none"> <li>*(a). Increase in muscular</li> </ul> </li> </ol>

<p>long-term benefits of exercise on physical/mental health:</p> <ul style="list-style-type: none"> <li>(a). Reduced risk of chronic disease (e.g. heart disease)</li> <li>(b). Reduced risk of bone disease (e.g. osteoporosis)</li> <li>(c). Reduced risk of some health conditions (e.g. obesity, back pain)</li> <li>(d). Improved management of some health conditions (e.g. asthma, diabetes, arthritis)</li> <li>(e). Improved management of mental health (e.g., enhance self-efficacy, self-esteem, reduce anxiety and depression)</li> </ul> <p>2. Know a range of simple methods for monitoring their own health (e.g. health related behaviour questionnaire, food and activity diary, measuring height and weight (BMI), blood pressure)</p> <p><b>Competence and Motor Skills</b></p> <p>*1. Demonstrate concern for and</p>	<p>and posture; enhanced functional capacity and sport or dance performance)</p> <p>4. Know a range of simple methods for monitoring their own and others' physical activity levels (e.g. questionnaire, activity diary, pedometer, heart rate monitor)</p> <p>*5. Understand the difference between whole-body activities (e.g. walking, jogging, cycling, dancing, swimming) that help reduce body fat and conditioning exercises (e.g. straight and twisting curl-ups) that improve muscle tone</p> <p><b>C. Safe Practice</b></p> <p>*1. Understand why certain exercises and practices are not recommended:</p> <ul style="list-style-type: none"> <li>*(a) standing toe touches</li> <li>*(b) straight leg sit-ups</li> <li>*(c) bouncing in stretches</li> <li>*(d) flinging movements</li> </ul> <p><b>Competence and Motor Skills</b></p> <p>*1. Participate in physical activity of at least moderate intensity for a minimum of 30 to 60 minutes a day including during</p>	<p>strength, endurance and flexibility</p> <ul style="list-style-type: none"> <li>*(b). Improved muscle tone and posture</li> <li>*(c). Enhanced functional capacity and sport or dance performance</li> </ul> <p>*2. Understand the difference between whole-body activities that help reduce body fat and conditioning exercises that improve muscle tone</p> <p><b>Competence and Motor Skills</b></p> <ul style="list-style-type: none"> <li>1. Be able to perform a range of fitness tests safely and with appropriate technique</li> <li>2. Be able to choose monitoring items to assess their own health-related fitness through home tasks, self and partner/peer assessments</li> </ul>
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<p>understanding of back care by lifting, carrying and placing</p> <p>*2. Be able to administer first aid and resuscitation techniques</p> <p><b>Behavioural Skills</b> Be able to monitor and evaluate their health and lifestyle via different methods (e.g. health/lifestyle questionnaire, food and activity diary, measuring height and weight (BMI), blood pressure)</p> <p><b>Attitudes and Confidence</b> *1. Have a positive attitude towards a healthy lifestyle (e.g regarding drug use, alcohol consumption, smoking, sexual behavior and relationships)</p>	<p>lessons, playtimes and club activities</p> <p>*2. At least twice a week, participate in activities that help to enhance and maintain muscular strength and flexibility and bone health</p> <p>3. Perform with good technique developmentally appropriate cardiovascular activities and strength and flexibility exercises for each of the major muscle groups</p> <p><b>Behavioural Skills</b> <b>A. Physical Activity Promotion</b></p> <ol style="list-style-type: none"> <li>1. Be able to access information about a range of physical activity opportunities at school, home and in the local community and know ways of incorporating exercise into their lifestyles (e.g. walking or cycling to school or to meet friends, helping around the home or garden)</li> <li>2. Be able to monitor and evaluate their personal physical activity levels over a period of time via different methods (e.g. activity diary, pedometer, heart rate monitor)</li> <li>3. Be able to identify the physical activity opportunities available in their community, appreciate the barriers and constraints to their physical activity participation (e.g. traffic safety, hot weather), and find ways of overcoming these</li> </ol>	<p><b>Behavioural Skills</b></p> <ol style="list-style-type: none"> <li>1. Be able to interpret fitness test results</li> <li>*2. Be able to perform exercises and tests safely and with appropriate technique: <ol style="list-style-type: none"> <li>(a) holding stretches still</li> <li>(b) seated 'sit-and-reach'</li> <li>(c) curl-ups with bent legs</li> <li>(d) performing movements with control</li> </ol> </li> </ol> <p><b>Attitudes and Confidence</b></p> <ol style="list-style-type: none"> <li>1. To focus on personal improvement, not comparisons with others</li> <li>2. Have a positive attitude towards fitness and fitness-related activities and tests</li> </ol>
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	<p><b>B. Warming up and Cooling Down</b></p> <ol style="list-style-type: none"><li>1. Be able to plan and perform each component of a warm-up and cool-down for general physical activity and for a specific physical activity</li></ol> <p><b>Attitudes and Confidence</b></p> <ol style="list-style-type: none"><li>1. Have a positive attitude towards accessing and sustaining involvement in physical activity, and participating with confidence</li><li>2. Reflect on their physical activity strengths and preferences and know how to become involved in activities</li></ol>	
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\* Partly taken and adapted from Harris (2000). Health-Related Exercise in the National Curriculum Key Stages 1 to 4, pp. 36-40.



## **6.6 Summary**

A number of issues and themes associated with monitoring pupils' health, physical activity and fitness within the school PE curriculum have been discussed in this chapter. Based on relevant literature and findings, recommendations have also been made and some guidance presented (Table 6.1) for teachers with regard to monitoring health, physical activity and physical fitness within the PE curriculum. It is suggested that pupils' knowledge and understanding of health, physical activity and fitness could and should be monitored within the PE curriculum because it is likely to be an effective and feasible strategy for promoting pupils' lifelong participation in physical activity and their overall health and well-being. Furthermore, the status and prevalence of monitoring health and physical activity within the curriculum should be increased to that of fitness testing. If the recommendations made in this study could be adopted, and the guidance followed, a number of teachers' and academics' concerns about monitoring could be addressed and more widespread good monitoring practice employed. This could ultimately lead to enhanced pupils' knowledge and understanding about health, physical activity and fitness resulting in more young people engaging in healthy, active lifestyles.

## **6.7 Research Limitations**

There are a number of limitations to this study. Firstly, the subjects involved were a sample of HoPEs in state secondary schools in England and their views and opinions may not represent those of PE teachers in other state secondary schools, nor indeed in primary or middle schools, or of those in other countries such as Taiwan. It would have been interesting to have gathered data from other teachers for comparison.

Secondly, a number of HoPEs did not return their questionnaires which may have led to some bias in the data obtained. For example, it may be that those teachers with a

particular interest in the area chose to complete the questionnaire whereas those with less interest did not.

Thirdly, although the sample size of the survey was acceptable, it would have been advantageous to have had a larger sample. This may have provided a more representative picture of health, physical activity and fitness monitoring within secondary school curricula across England.

In addition, due to financial and time constraints, the interviews took place in only five geographical areas of England and included just eleven HoPEs. Related to the earlier point, it is possible that the HoPEs involved in the interviews had a particular interest in the area, thus biasing the data obtained. The interviewees also had only a limited amount of time to give and therefore the interviews were relatively short; thus, the data collected could have limited meaning due to the interviews not being as in-depth as might have been.

It would have been interesting to have obtained evidence of actual rather than reported monitoring practices in schools via documentation analysis and/or lesson observations. It would also have been interesting to have obtained data from pupils via individual interviews or focus groups about their experiences of monitoring health, physical activity and fitness within the PE curriculum.

## **6.8 The Application of this Research to the Taiwanese Context**

The issues associated with monitoring pupils' health, physical activity and fitness within the school curriculum, as identified in the literature and the findings of this study, and the recommendations to address these, are relevant to the Taiwanese context. From the results of this study, the importance of implementing health, physical activity and fitness within the PE curriculum can be inferred, not only for pupils in England but also for those in Taiwan. As mentioned in chapter 1, the

prevalence, phenomena and issues of fitness testing within the Taiwanese school curriculum are similar, yet even more pertinent than in England. This is because, in recent years (2007), the Minister of Education has announced a fitness assessment standard for school students that identifies testing items and a testing operational process ([www.fitness.org.tw](http://www.fitness.org.tw)). Furthermore, a 'Fitness Passport' has been issued to each student that contains criterion-referenced fitness standards for male and female students of different ages. PE teachers are required to implement fitness testing for students each semester and record each student's fitness test results. Whilst it could be argued that this provides Taiwan's PE teachers with a standard and procedures to follow, given it is a compulsory requirement means that teachers and students are not empowered to make their own decisions and choices about fitness testing. Thus, issues of validity and reliability, the potential negative impact of testing, and the inappropriateness of some fitness tests highlighted in this study are applicable to Taiwan's school curriculum. Students' experiences may be negative which could affect their attitudes towards physical activity and as a result they may be 'turned off' physical activity. It also means that pupils' experiences of monitoring are likely to be narrow and limited, and restricted to fitness testing only.

As an educator and researcher from Taiwan, my view is that there is some urgency with respect to addressing the issues associated with monitoring pupils' health, physical activity and fitness within Taiwan's school curriculum in appropriate and effective ways. However, this is likely to be a long and challenging process. Yet, there are opportunities for incorporating other and more appropriate methods of monitoring within the curriculum. For example, and as mentioned in chapter 1, since 2001, in the current 'Grade 1-9 Curriculum', health and physical education have been combined into one field, which implies that Taiwan's PE curriculum has gradually transformed from a focus on physical training to one that prioritises health and

lifetime physical activity participation (Ho et al., 2009; Lin & Lou, 2003). With specific reference to the seven main themes of 'health and physical education' (see Chapter 1, section xxxx), health monitoring could be incorporated within the themes of 'growth and development', 'humans and food', 'mental health', and/or 'social behaviour'; physical activity monitoring could be incorporated within the themes of 'sports participation' and 'safety lifestyle'; and fitness monitoring could be addressed within the themes of 'sports skills' and 'safety lifestyle'.

However, transferring educational concepts and practices from one cultural context to another involves not merely a 'transfer,' but a 'transformation.' Kandel (1970, p.14) stated that 'the educational systems and practices of one nation cannot be transported to another nation or to other people without profound adaptations and modifications'. The difficulty in implementing an educational philosophy from one country to another is inevitably great and the challenges to be faced include differences in traditional custom, economic and political conditions, social structure, educational system, and lifestyle. Thus, in order to transfer educational concepts and practices from one country to another, it is vital to revise concepts and adapt practices to suit the different culture. This is discussed further in section 6.8.1.

Any efforts however, to change monitoring practice in Taiwan and to transfer the principles and recommendations highlighted within this research, should be based on clear and substantial evidence of existing practice. Thus, the following outlines the proposed developments that are considered necessary to successfully integrate health, physical activity and fitness monitoring into Taiwan's Grade 1-9 'Health and Physical Education' Curriculum.

1. Survey: a questionnaire survey on monitoring health, physical activity and fitness in the secondary physical education curriculum in Taiwan needs to be conducted.

This should involve a random sample of schools to try to establish the current content, organisation and delivery of monitoring in the curriculum, as well as to explore teachers' views of and approaches to such monitoring.

2. Curriculum Review Committee: with financial support from the government, it is proposed that a 'curriculum review committee' comprising officials, scholars, principals and teachers be formulated to analyse the feasibility and strategy for health, physical activity and fitness monitoring in health and physical education within the Grade 1-9 Curriculum. In light of the survey findings from 1 above and the findings from this study and the broader literature, it is important to clarify the role that health, physical activity and fitness monitoring should play in the curriculum. The purpose of fitness testing also needs to be reviewed and clarified in relation to the future direction of the health and physical education curriculum.
3. Syllabus: the 'curriculum review committee' should discuss and examine the appropriateness of the guidance generated from this study (see Table 6.1) in relation to Taiwan's culture, educational system, and curriculum. The guidance could be used as the basis on which to develop a health, physical activity and fitness monitoring programme of study for the Grade 1-9 Curriculum, which would include an instructional manual and resource book for teachers.
4. Process of evaluation: teachers from randomly selected schools could be asked to pilot and provide feedback on the sample instructional manual and resource book from a teacher's and the pupils' perspective.. The instructional manual and resource book would then be revised based on the feedback, and the revised versions would subsequently be implemented.
5. Support and resources: although health, physical activity and fitness monitoring are implemented in the 'Health and PE' curriculum, the coordination of the whole school environment, the adjustment of school policy, the attitude of principals and

all teachers also influence the delivery and its effects. In order to achieve real as opposed to only superficial or surface changes with respect to the implementation of health, physical activity and fitness monitoring within the 'Health and PE' curriculum, initial training and continuing professional development focusing on policy and practice in this area could be developed. This would help to avoid possible misunderstandings and/or continued questionable practices by teachers who might otherwise simply relate traditional ideology to a newly revised curriculum guideline, thus resulting in more 'innovation without change'. Kirk (1988, p.82) considers that 'It is possible to present an innovation that embodies some new ideas without this ever bringing about any genuine change in what people think and do'. PE teachers should be encouraged to think outside of the traditional frame and regard monitoring as neither a test nor evaluation standard, but as an opportunity to promote autonomous learning. Only when teachers fully understand the concept, purpose, and influence of health, physical activity and fitness monitoring will such a programme be integrated into Taiwan's existing school curriculum.

### **6.8.1 Features of Taiwan Education Culture Relevant to the Implementation of Health, Physical Activity and Fitness Monitoring**

The following represents specific features of the Taiwan education culture which need to be taken into account when considering implementing health, physical activity and fitness monitoring within Taiwan's school curriculum.

1. Entrance examination system: Due to the entrance examination system in Taiwan, academic performance in the exam dominates the admission process to high schools. The subjects included within the examination are: Chinese, English,

Mathematics, Physics, Chemistry, History, and Geography, but not Health and PE. It could be argued that, without the pressure of the entrance examination, PE teachers are afforded more autonomy and room for developing different approaches and content in their teaching. Thus, there is room and flexibility to integrate health, physical activity and fitness monitoring into the current Health and PE curriculum. The biggest challenge, however, is likely to be the willingness of the teachers to accept the importance and place of monitoring in the curriculum. If teachers can receive sufficient continuing professional development and are provided with sufficient support and resources, they may come to appreciate the potential of health, physical activity and fitness monitoring, be more confident, and therefore more inclined to implement it.

2. Parents' attitudes: The entrance exam system also has an impact on the attitudes of parents regarding the academic performance of students, since Taiwan has long been influenced by the Confucian belief that being a scholar puts one at the top of the social hierarchy. Professional sports and sport clubs are not very popular in Taiwan and many parents do not allow their children to spend too much time on sports activities during school semesters (Hung, 2006; Shu & Chou, 2008). Only by emphasizing the importance of health, physical activity and fitness monitoring within the curriculum will parents understand that it potentially plays a major role in improving the health of pupils by enhancing their awareness of the importance of a healthy lifestyle and addressing misconceptions regarding health, physical activity and fitness.
3. Pupils' attitudes: In Taiwan, traditional PE courses that have long emphasized the training of sports skills and physical strength now include fitness testing. For pupils who are talented in sports, the time and resources provided by schools may not be enough, but for those who are not the 'sporty' type, school PE is often

considered a waste of time and tiring (Hung, 2006; Shu & Chou, 2008; <http://www.ceag.kh.edu.tw>). As with parents, PE courses are viewed by many pupils as relatively unimportant in comparison to the entrance exam subjects. Therefore, if health, physical activity and fitness monitoring can be effectively integrated into the Health and PE curriculum, pupils will likewise see the relevance and importance and begin to value it. In addition, with different course designs, students will be empowered and given the opportunity to have ownership of their own learning.



## Chapter 7: Conclusions

### **7.1 Conclusions**

The importance of monitoring pupils' health, physical activity and fitness levels has been emphasised in the literature (Cale & Harris, 2005b; Corbin & Lindsey, 2002; McKenzie, 2001b; Pangrazi, 2000; Welk & Wood, 2000). However, limited research has been conducted on the prevalence of such monitoring and the factors influencing this. The goal of this research, therefore, was to review the worldwide literature on monitoring the health, physical activity and fitness of young people, to determine the purpose that teachers recognised a number of purposes for monitoring health, activity and fitness and prevalence of monitoring pupils' health, physical activity and physical fitness levels within the school curriculum in England, to investigate the factors affecting HoPEs' views of and approaches to monitoring, and to propose recommendations relating to monitoring pupils' health, physical activity and fitness within the curriculum.

The findings from the literature review revealed that there are a range of methods of monitoring young people's health, physical activity and fitness in schools, each with its own advantages and disadvantages. Furthermore, schools can employ different approaches to improve pupils' learning in relation to health, physical activity and fitness, and to help them develop competence and confidence in making their own decisions, identifying their own health concerns, and increasing control over their own lives. PE teachers could re-appraise their teaching philosophies and teaching styles, thereby increasing pupils' knowledge and understanding of health issues and employing appropriate monitoring methods. These would help to enhance pupils' lifelong participation in activity which is one of the main aims of physical education (Armstrong & McManus, 1994; Cale, 1998; Harris, 2000; MMWR, 1997; Stratton et al., 2008). That debate concerning the value of fitness testing has been

on-going for some time, that there are limitations in fitness testing with children and some questionable fitness testing practices are not suitable for children. Thus, it was suggested that fitness testing should only be adopted if it was meaningful, relevant and had 'a direct and positive influence on motivating teachers/pupils to develop active lifestyles'.

This study revealed that fitness monitoring was common place and was more frequently practised in secondary schools than health or physical activity monitoring. Despite this however, most HoPEs still considered it desirable to monitor young people's health and physical activity within the school curriculum, and believed that monitoring should be an important component of the PE programme. Thus, the status and prevalence of monitoring health and physical activity within the curriculum should be increased to that of fitness testing.

These findings also indicated that a number of factors influenced the prevalence of monitoring. For example, the main reasons for not monitoring health and physical activity were insufficient time and resources. An additional factor was confusion surrounding who is responsible for monitoring children's health and physical activity. However, it is argued that schools and PE in particular remain obvious channels for monitoring children's health, physical activity and fitness.

Another factor influencing HoPEs' views and attitudes towards monitoring was found to be their understanding of the concepts and how to 'measure' these in an educational setting. For example, findings revealed: (1) limited understanding amongst the HoPEs about the relationship between health, physical activity and fitness; (2) a lack of familiarity with appropriate monitoring methods; and (3) that many had misconceptions and assumptions about the appropriateness of fitness testing with most believing that testing could help pupils to become more physically active.

Finally, and given the above, several recommendations were proposed relating to monitoring pupils' health, physical activity and physical fitness within the school PE curriculum and some formal guidance developed. Teachers are encouraged to adopt the recommendations and guidance. If the recommendations could be adopted, and the guidance followed, a number of teachers' and academics' concerns about monitoring could be addressed and more widespread good monitoring practice employed. This could ultimately lead to young people experiencing health, activity and fitness monitoring in positive and meaningful ways, which are likely to be effective in promoting healthy, active lifestyles.

## **7.2 Suggestions for Future Research**

Given the limitations of this study acknowledged earlier (Chapter 6.7), it is suggested that future research could:

1. Be conducted in more and different types of schools in England (e.g. independent; primary) and with teachers other than HoPEs, in an attempt to gain as representative a picture of monitoring health, physical activity and fitness in schools as possible. It would also be interesting and seem important to replicate a similar study in Taiwan in order that a fuller picture of monitoring in the Taiwanese context can be gained and detailed information about teachers' views and practices obtained to inform future policy and practice.
2. Include analysis of associated school/PE documentation such as schemes and units of work, lesson plans, assessment data and/or records and/or observation of monitoring procedures within lessons, in order to verify and triangulate the data obtained from the HoPEs.
3. Explore pupils' experiences, understanding of, and views about monitoring health, physical activity and fitness within the PE curriculum in an attempt to gain a more in depth picture from a pupil perspective.

4. Explore and evaluate the uptake and impact of the recommendations and formal guidance on monitoring health, physical activity and fitness on schools' and teachers' actual policy and practice.

## References

- Al-Hazzaa, H. M., Sulaiman, M. A., Al-Matat, A. J., & Al-Mobaireek, K. F. (1994). Cardiorespiratory fitness, physical activity patterns and coronary risk factors in preadolescent boys. *International Journal of Sports Medicine*, 15, 267-272.
- Almond, L. (1996). A New Vision for Physical Education. In N. Armstrong (Ed.), *New Direction in Physical Education. Change and Innovation* (pp. 189-197). New York: Cassell.
- Almond, L., & Harris, J. (1997). Does Health Related Exercise deserve a hammering or help? *British Journal of Physical Education*, 28(2), 25-27.
- Alpert, B. S., & Willmore, J. H. (1994). Physical activity and blood pressure in adolescents. *Pediatric Exercise Science*, 6(4), 361-380.
- American Alliance for Health Physical Education and Recreation (AAHPER). (1976). *AAHPER youth fitness test manual*. Washington, DC.: American Alliance for Health, Physical Education and Recreation (AAHPER).
- American Alliance for Health Physical Education Recreation and Dance (AAHPERD). (1988). *Physical best: a physical fitness education and assessment program*. Reston, VA.: AAHPERD.
- American College of Sports Medicine (ACSM). (2000). Exercise testing and prescription for children, the elderly, and pregnant women. In *ACSM's Guidelines for Exercise Test and Prescription* (pp. 217-234). Philadelphia, PA: Lippincott Williams & Wilkins.
- American College of Sports Medicine (ACSM). (1988). Opinion statement on physical fitness in children and youth. *Medicine and Science in Sports and Exercise*, 20(4), 422-423.
- American College of Sports Medicine (ACSM). (2006). Health-Related Physical Fitness Testing and Interpretation. In *ACSM's Guidelines for Exercise Testing*

*and Prescription* (7th ed., pp. 55-92). Philadelphia, PA: Lippincott Williams & Wilkins.

American Health and Fitness Foundation. (1986). *Fit Youth Today*. Austin, TX: American Health and Fitness Foundation.

Anderson, L. B. (1994). Blood pressure, physical fitness and physical activity in 17-year-old Danish adolescents. *Journal of Internal Medicine*, 236, 323-330.

Andreoli, A., Monteleone, M., Loan, M. V., Promenzio, L., Tarantion, U., & De Lorenzo, A. (2001). Effects of different sports on bone density and muscle mass in highly trained athletes. *Medicine Science in Sports Exercise*, 33, 507-511.

Armstrong, N. (1989). Is fitness testing either valid or useful? *British Journal of Physical Education*, 20, 66-67.

Armstrong, N. (1990). Children's Physical Activity Patterns: The Implications for Physical Education. In N. Armstrong (Ed.), *New Direction in Physical Education* (Vol. 1, pp. 1-15): Human Kinetic.

Armstrong, N. (2004). Children are fit and active - fact or fiction? *Health Education*, 104(6), 333-335.

Armstrong, N., Balding, J., Genrle, P., & Kirby, B. (1990). The estimation of coronary risk factors in British school children- a preliminary report. *British Journal of Sports Medicine*, 24, 61-66.

Armstrong, N., & Biddle, S. (1992). Health-related physical activity in the national curriculum. In N. Armstrong (Ed.), *New Directions in Physical Education* (Vol. 2, pp. 71-110). Champaign, IL: Human Kinetic.

Armstrong, N., & Fawkner, S. G. (2007). Aerobic Fitness. In N. Armstrong (Ed.), *Paediatric Exercise Physiology* (Vol. 8, pp. 161-187). London: Elsevier

Armstrong, N., & McManus, A. (1994). Children's fitness and physical activity- a

- challenge for physical education. *British Journal of Physical Education*, 25, 20-26.
- Armstrong, N., & Mechelen, W. V. (1998). Are young people fit and active? In HEA (Ed.), *Young and Active* (pp. 69-97). London: HEA.
- Armstrong, N., & Simons-Morton, B. G. (1994). Physical activity and blood lipids in adolescents. *Pediatric Exercise Science*, 6, 381-405.
- Armstrong, N., & Van Mechelen, W. (1998). Are young people fit and active? . In S. Biddle, J. Sallis & N. Cavill (Eds.), *Young and Active? Young People and Health-Enhancing Physical Activity- Evidence and Implications* (pp. 69-97). London: Health Education Authority.
- Armstrong, N., & Welsman, J. (1994). Assessment and interpretation of aerobic function in children and adolescents. *Exercise and Sport Science Review*, 22, 435-476.
- Armstrong, N., & Welsman, J. (1997a). Physical activity and body fatness. In N. Armstrong & J. Welsman (Eds.), *Young People and Physical Activity* (pp. 179-192). Oxford: Oxford University Press.
- Armstrong, N., & Welsman, J. (1997b). Physical Activity Patterns. In N. Armstrong & J. Welsman (Eds.), *Young People & Physical Activity* (pp. 103-121). Oxford: Oxford University Press.
- Armstrong, N., & Welsman, J. (1997c). Physical activity and aerobic fitness. In N. Armstrong & J. Welsman (Eds.), *Young people and physical activity* (pp. 122-136): Oxford University Press.
- Armstrong, N., & Welsman, J. (2000). Development of Aerobic Fitness During Childhood and Adolescence. *Pediatric Exercise Science*, 12, 128-149.
- Asher, S. R., & Wheeler, V. A. (1985). Children's loneliness: A comparison of rejected and neglected peer status. *Journal of Consulting and Clinical Psychology*, 53,

- Asmussen, E. (1962). Muscular performance. In K. Rodahl & S. M. Horvath (Eds.), *Muscle as a Tissue* (pp. 161-175). New York: McGraw-Hill.
- Astrand, P. O. (1994). *Physical activity and fitness: evolutionary perspective and trends for the future*. Paper presented at the International Conference on Physical Activity, Fitness and Health, Toronto.
- Atlantis, E., Barnes, E. H., & Fiatarone Singh, M. A. (2006). Efficacy of exercise for treating overweight in children and adolescents: A systematic review. *International Journal of Obesity*, 30, 1027-1040.
- Bailey, D. A., & Martin, A. D. (1994). Physical activity and skeletal health in adolescents. *Pediatric Exercise Science*, 6(4), 330-347.
- Bailey, D. A., McKay, H. A., Mirwald, R. L., Crocker, P. R., & Faulkner, R. A. (1999). A six-year longitudinal study of the relationship of physical activity to bone mineral accrual in growing children: the University of Saskatchewan bone mineral accrual study. *Journal of Bone Mineral Research*, 14, 1672-1679.
- Banks-Wallace, J. (2000). Staggering under the weight of responsibility: The impact of culture on physical activity among African American women. *Journal of Multicultural Nursing and Health*, 6(3), 24-30.
- Bar-Or, O. (1993). Importance of differences between children and adults for exercise testing and exercise prescription. In J. S. Skinner (Ed.), *Exercise Testing and Prescription for Special Cases* (2nd ed., pp. 57-74): Lea Febiger.
- Bar-Or, O., & Baranowski, T. (1994). Physical activity, adiposity and obesity among adolescents. *Pediatric Exercise Science*, 6, 348-360.
- Baranowski, T. (1988). Validity and reliability of self-report of physical activity: an information processing perspective. *Research Quarterly of Exercise and Sport*, 59(4), 314-327.



- Barber, G. (2000). Cardiovascular function. In N. Armstrong & W. Van Mechelen (Eds.), *Paediatric exercise science and medicine* (pp. 56-64). Oxford: Oxford University Press.
- Bassett, D. R., Ainsworth, B. E., & Leggett, S. R. (1996). Accuracy of five electronic pedometers for measuring distance walked. *Medicine and Science in Sports and Exercise*, 28, 1071-1077.
- Bassett, D. R., Ainsworth, B. E., Swartz, A. M., Strath, S. J., O'Brien, W. L., & King, G. A. (2000). Validity of four motion sensor in measuring moderate intensity physical activity. *Medicine and Science in Sports and Exercise*, 32 (supplement), s471-480.
- Beattie, M. (1995). New prospects for teacher education: narrative ways of knowing teaching and teacher learning. *Educational Research*, 37(1), 53-70.
- Beghin, L., Michaud, L., Guimber, D., Vaksman, G., Turck, D., & Gottrand, F. (2002). Assessing sleeping energy expenditure in children using heart-rate monitoring calibrated against open-circuit indirect calorimetry: a pilot study. *British Journal of Nutrition* 88, 533-543.
- Beighle, A., & Pangrazi, R. P. (2006). Measuring children's activity levels: the association between step-counts and activity time. *Journal of Physical Activity and Health*, 3, 221-229.
- Berenson, G. S., Wattedney, W. A., Bao, W., Srinivasan, S. R., & Radhakrishnamurthy, B. (1995). Rational to study the early natural history of heart disease: the Bogalusa heart study. *American Journal of Medicine Science*, 310, S22-28.
- Beunen, G., & Malina, R. M. (1988). Growth and physical performance relative to the timing of the adolescent spurt. *Exercise and Sport Science Review*, 16, 503-540.
- Biddle, S. (1991). *A practical guide to a physically active life*. Exeter: F.I.T System.

- Biddle, S., Gorely, T., & Stensel, D. (2004). Health-enhancing physical activity and sedentary behaviour in children and adolescents. *Journal of Sports Science*, 2004(22), 8.
- Biddle, S., & Mutrie, N. (1991). *Psychology of physical activity and exercise: a health-related perspective*. London: Springer.
- Biddle, S., Sallis, J., & Cavill, N. (1998). *Young and active? Young people and health-enhancing physical activity - evidence and implication*. London: Health Education Authority.
- Blair, S. N., Clark, D. G., Cureton, K. J., & Powell, K. (1989). Exercise and fitness in childhood: implications for a lifetime of health. In C. Gisolfi & D. R. Lamb (Eds.), *Perspectives in Exercise Science and Sports Medicine* (Vol. 2, pp. 401-430). Indianapolis: Benchmark Press.
- Blimkie, C. J. R. (1989). Age and sex-associated variation in strength during childhood: anthropometric, morphological, neurologic, biomechanical, endocrinologic, genetic and physical activity correlated. In C. Gisolfi & D. R. Lamb (Eds.), *Perspectives in Exercise Science and Sports Medicine* (Vol. 2, pp. 99-161). Indianapolis, IN: Benchmark Press.
- Blimkie, C. J. R. (1993). Benefits and risks of resistance training in children. In B. R. Cahill & A. J. Pearl (Eds.), *Intensive Participation in Children's Sports* (pp. 133-165). Champaign, IL: Human Kinetics.
- Boreham, C. A., & Riddoch, C. (2001). The physical activity, fitness and health of children. *Journal of Sports Science*, 19, 915-929.
- Boreham, C. A., Twisk, J., Savage, M. J., Cran, G. W., & Strain, J. J. (1997). Physical activity, sports participation and risk factors in adolescents. *Medicine Science of Sports and Exercise*, 29, 788-793.
- Bouchard, C., Shephard, R. J., & Stephens, T. (1994). *Physical activity, fitness and*

*health- international proceedings and consensus statement*. Champaign, IL: Human Kinetic.

Bouchard, C. R. M., Malina, R. M., & Perusse, L. (1997). *Genetics of Fitness and Physical Performance*. Champaign, IL: Human Kinetics.

Brage, S., Brage, N., Ekelund, F., Luan, J., Franks, P. W., Froberg, K., et al. (2005). Effect of combined movement and heart rate monitor placement on physical activity estimates during treadmill locomotion and free-living *European Journal of Applied Physiology*, 96(5), 517-524.

Brewer, J., & Davis, J. (1992; 2000). *Abdominal Curl Conditioning Test: A Progressive Sit-up Test*. Leed: The National Coaching Foundation (now Sports Coach UK).

Brewer, J., Ramsbottom, R., & Williams, C. (1988). *Multistage Fitness Test: A progressive Shuttle Run Test for the Prediction of Maximum Oxygen Uptake*. Leeds, UK: National Coaching Foundation.

Bryman, A. (1988). *Quantity and Quality in Social Research*. London: Routledge.

Bucher, C. A. (1974). National adult physical fitness survey: some implications. *Journal of Health Physical Education and Recreation*, 45, 25-28.

Bulger, S. M., Mohr, D. J., Carson, L. M., & Wiegand, R. L. (2001). Infusing health-related physical fitness in physical education teacher education. *Quest*, 53, 403-417.

Bundred, P., Kitchiner, D., & Buchan, I. (2001). Prevalence of overweight and obese children between 1989 and 1998: Population based series of cross sectional studies. *British Medical Journal*, 322, 326-328.

Caan, B., Armstrong, M. A., & Selby, J. V. (1994). Changes in measurements of body fat distribution accompanying weight change. *International Journal of Obesity*, 18, 397-404.

- Cale, L. (1994). Self-report measures of children's physical activity: recommendations for future development and a new alternative measure. *Health Education Journal*, 53, 439-453.
- Cale, L. (1998). Monitoring young people's physical activity. *The British Journal of Physical Education*, 29(2), 28-30.
- Cale, L. (2000). Physical activity promotion in secondary schools. *European Physical Education Review*, 6(1), 71-90.
- Cale, L., & Harris, J. (1998). The Benefits of Health-Related Physical Education and Recommendations for Implementation. *The Bulletin of Physical Education*, 34(1), 27-41.
- Cale, L., & Harris, J. (2002). National fitness testing for children- issues, concerns and alternatives. *The British Journal of Physical Education*, 33(1), 32-34.
- Cale, L., & Harris, J. (2005a). Fitness Testing and Exercise Promotion. In L. Cale & J. Harris (Eds.), *Exercise and Young People*. (pp. 209-231). London: Palgrave Macmillan.
- Cale, L., & Harris, J. (2005b). Monitoring Young People's Physical Fitness and Physical Activity. In L. Cale & J. Harris (Eds.), *Exercise and Young People* (pp. 41-80). London: Palgrave Macmillan.
- Cale, L., & Harris, J. (2005c). Young people's physical activity and fitness status. In *Exercise and young people* (pp. 9-39). London: Palgrave Macmillan.
- Cale, L., & Harris, J. (2006). School based physical activity interventions -effectiveness, trends, issues, implications and recommendations for practice. *Sport, Education and Society*, 11(4), 401-420.
- Cale, L., & Harris, J. (2009a). Dispelling myths and misunderstanding and establishing facts. In L. Cale & J. Harris (Eds.), *Getting the Buggers Fit* (pp. 15-26): In press.

- Cale, L., & Harris, J. (2009b). Fitness testing in physical education - a misdirected effort in promoting healthy lifestyles and physical activity? *Physical Education and Sport Pedagogy*, 4(1), 89-108.
- Cale, L., Harris, J., & Chen, M. H. (2007). More Than 10 Years After "The Horse is Dead...": Surely It Must Be Time to 'Dismount'?! *Pediatric Exercise Science*, 19, 115-131.
- Calfas, K. J., & Taylor, W. C. (1994). Effects of physical activity on psychological variables in adolescents. *Pediatric Exercise Science*, 6(4), 406-423.
- Capel, S. (2000a). Making change in physical education. In S. Capel & S. Piotrowski (Eds.), *Issues in physical education* (pp. 221-240). London: Routledge.
- Capel, S. (2000b). Re-reflecting on priorities for physical education: now and in the twenty-first century. In S. Capel & S. Piotrowski (Eds.), *Issues in physical education*. London: Routledge.
- Caplan, R., & Holland, R. (1990). Rethinking health education theory. *Health Education Journal*, 49, 10-12.
- Cardon, G., & Bourdeaudhuij, I. (2002). Physical Education and physical activity in elementary schools in Flanders. *European Journal of Physical Education*, 7(1), 5-18.
- Cardon, G., & De Bourdeaudhuij, I. (2002). Physical education and physical activity in elementary schools in Flanders. *European Journal of Physical Education*, 7(1), 5-18.
- Cash, T. F. (2000). *User's manual for the multidimensional Body-Self Questionnaire*. Norfolk, VA: Old Dominion University.
- Caspersen, C. J., Powell, K. E., & Christensen, G. M. (1985). Physical activity, exercise, and physical fitness; Definitions and distinctions for health-related research. *Public Health Report*, 100, 126-131.

- Cauderay, M., Narring, F., & Michaud, P.-A. (2000). A Cross-Sectional Survey Assessing Physical Fitness of 9 to 19-Year- Old Girls and Boys in Switzerland. *Pediatric Exercise Science, 12*, 398-412.
- Cavill, N. (2001). Health enhancing physical activity for young people: state of the United Kingdom Expert Consensus Conference. *Pediatric Exercise Science, 13*(1), 12-25.
- Cavill, N., Biddle, S., & Sallis, J. F. (2001). Health Enhancing Physical Activity for Young People: Statement of the United Kingdom Expert Consensus Conference. *Pediatric Exercise Science, 13*, 12-25.
- CDC. (2006). Youth risk behavior surveillance-United States. *MMWR, 55*(SS-5), 1-108.
- Centers for Disease Control and Prevention (CDC). (2003). Physical activity levels among children aged 9-13 years- United States, 2002. *MMWR, 52*, 785-788.
- Centers for Diseases Control. (1997). Guidelines for school and community programs to promote lifelong physical activity among young people. *Morbidity and Mortality Weekly Report, 46*(RR-6), 1-35.
- Centers for Diseases Control and Prevention. (2003). *Youth Risk Behavior Surveillance-United States*. Washington, DC.: Centers for Diseases Control and Prevention.
- Chrysler Fund-Amateur Athletic Union. (1991). *Chrysler Fund- AAU Physical Fitness Program*. Bloomington, IN.: Chrysler Fund- AAU.
- Claessens, A. L., Beunen, G., & Malina, R. M. (2000). Anthropometry, physique, body composition and maturity. In N. Armstrong & W. Van Mechelen (Eds.), *Paediatric Exercise Science and Medicine* (pp. 11-21). Oxford: Oxford University Press.
- Clarke, H. H. (1974). National adult physical fitness survey. *Physical Fitness*

Clarke, W. R., & Lauer, R. M. (1993). Does childhood obesity track into adulthood?

*Critical Review in Food Science and Nutrition*, 33, 423-430.

Cohen, L., Manion, L., & Morrison, K. (2001). *Research methods in education* (5th ed.). London: Routledge.

Cole, T. J., Bellizzi, M. C., Flegal, K. M., & Dietz, W. H. (2000). Establishing a standard definition for child overweight and obesity worldwide: international survey. *British Medical Journal*, 320, 1-6.

Connell, D. B., Turner, R. R., & Mason, E. F. (1985). Summary of findings of the School Health Education Evaluation: health promotion effectiveness, implementation, and costs. *Journal of School Health*, 55(8), 316-321.

Cooper, A. (2003). Objective measurement of physical activity. In J. McKenna & C. Riddoch (Eds.), *Perspectives on Health and Exercise* (pp. 83-108). Basingstoke: Palgrave Macmillan.

Cooper, C., Cawley, M., Bhalla, A., Egger, P., Ring, F., Morton, L., et al. (1995). Childhood growth, physical activity and peak bone mass in women. *Journal of Bone Mineral Research*, 10, 940-947.

Corbin, C. B. (2002). Physical activity for everyone: what every physical educator should know about promoting lifelong physical activity. *Journal of Teaching in Physical Education*, 21, 128-144.

Corbin, C. B., LeMasurier, G. C., & Lambdin, D. D. (2007). *Fitness for life: Middle school*. Champaign, IL: Human Kinetics.

Corbin, C. B., & Lindsay, R. (1984). *The Ultimate Fitness Book*. New York: Leisure Press.

Corbin, C. B., & Lindsey, R. (2002). *Fitness for Life* (4th ed.). Champaign, IL: Human Kinetics.

- Corbin, C. B., & Pangrazi, R. P. (1992). Are American children and youth fit? *Research Quarterly of Exercise and Sport*, 63(2), 96-106.
- Corbin, C. B., Pangrazi, R. P., & Welk, G. J. (1995). A response to "The Horse Is Dead; Let's Dismount". *Pediatric Exercise Science*, 7, 347-351.
- Council of Europe. (1988). *European Test of Physical Fitness - EUROFIT*. London: Sports Council.
- Craig, R., & Mindell, J. (2007). *Health Survey 2006. Volume 2. Obesity and Other Risk Factors in Children*: The Information Centre.
- Cunningham, D. A., Paterson, D. H., Blimkie, C. J. R., & Donner, A. P. (1984). Development of cardiorespiratory function in circumpubertal boys: a longitudinal study. *Journal of Applied Physiology*, 56, 302-307.
- Cureton, K. J., & Warren, G. (1990). Criterion-referenced standards for youth health-related fitness tests: a tutorial. *Research Quarterly of Exercise and Sport*, 61, 7-19.
- Currie, C., Roberts, C., Morgan, A., Smith, R., Settertobulte, W., Samdal, O., et al. (2004). Young people's health in context. Health Behaviour in School-aged Children (HBSC) study: international report from the 2001/2002 survey *Health Policy for Children and Adolescents*, 4.
- Danielle, R. B., & François, T. (2007). Reliability of the assessment of the oxygen/heart rate relationship during a workday *Applied Ergonomics*, 38(5), 491-497.
- Demir, A., & Tarhan, N. (2001). Loneliness and social dissatisfaction in Turkish adolescents. *The Journal of Psychology*, 135(1), 113-123.
- Denzin, N. K. (1978). *The research act: An introduction to sociological methods*. New York: McGraw-Hill.
- Department of Education and Employment and the Qualifications and Curriculum



- Authority (DfEE/QCA). (1999a). *The National Curriculum for Physical Education*. London: HMSO.
- Department of Education and Employment and the Qualifications and Curriculum Authority (DfEE/QCA). (1999b). *The National Curriculum. Handbook for Secondary Teachers in England*. London: HMSO.
- Department of Education and Science (DES). (1989). *Physical Education from 5 to 16, Curriculum Matters. 16. An HMI Series*. London: HMSO.
- Department of Education and Science and the Welsh Office (DES/WO). (1992). *Physical Education in the National Curriculum*. London: HMSO.
- Department of Education and the Welsh Office (DfE/WO). (1995). *Physical Education in the National Curriculum*. London: HMSO.
- Department of Health. (2004a). *At least five a week*. London: Crown Copyright.
- Department of Health. (2004b). *Choosing health. Making healthier choice easier*. London: HMSO.
- Department of Health and Human Services and Centers for Disease Control and Prevention. (1996). *Physical Activity and Health: A Report of the Surgeon General*. Atlanta, G.A.
- Dezswaltowski, D. A. (1997). The ecology of physical activity and sport: Merging science and practice. *Journal of Applied Sport Psychology*, 9, 254-276.
- Diamantopoulou, S., Rydell, A. M., & Henricsson, L. (2008). Can both low and high self-esteem be related to aggression in children? *Social Development* 17(3), 682-698.
- Dietz, W. H. (1998). Health consequences of obesity in youth: childhood predictors of adult disease *Pediatrics*, 101(3), 518-525.
- Dietz, W. H., & Robinson, T. N. (1998). Use of the body mass index (BMI) as a measure of overweight in children and adolescents. *Journal of Pediatric*, 132,

s191-193.

- Dishman, R. K. (2006). Measurement of Physical Activity. In W. J. C.-Z. Leonard W. Poon, Phillip D. Tomporowski (Ed.), *Active living, cognitive functioning, and aging* (pp. 91-112).
- Dishman, R. K., & Buckworth, J. (1996). Increasing physical activity: A quantitative synthesis. *Medicine and Science in Sports and Exercise*, 28, 706-719.
- Docherty, D., Wenger, H. A., & Collis, M. L. (1987). The effects of resistance training on aerobic and anaerobic power of young boys. *Medicine Science of Sports and Exercise*, 19, 389-392.
- Doganis, G., & Theodorakis, Y. (1995). The influence of attitude on exercise participation. In S. Biddle (Ed.), *European perspectives on exercise and sport psychology* (pp. 26-49). Champaign, IL: Human Kinetics.
- Dollman, J., Okely, A. D., Hardy, L., Timperio, A., Salmon, J., & Hills, A. P. (2008). A hitchhiker's guide to assessing young people's physical activity: deciding what method to use. *Journal of Science and Medicine in Sport*, 377, 1-8.
- Downie, R. S., Tannahill, C., & Tannahill, A. (1996). *Health Promotion Models and Values* (2nd ed.): Oxford University Press.
- Drinkwater, B. (1995). *Windows for the future*. Israel: AIESEP Conference.
- Duncan, M. J., Woodfield, L., Al-Nakeeb, Y., & Nevill, A. M. (2008). Difference in physical activity levels between white and south Asian children in the United Kingdom. *Pediatric Exercise Science*, 20, 285-291.
- Dunton, G. F., Schneider, M., Graham, D. J., & Cooper, D. M. (2006). Physical activity, fitness, and physical self-concept in adolescent females. *Pediatric Exercise Science*, 18, 240-251.
- Durant, R. H., Baranowski, T., & Davis, H. (1993). Reliability and variability of heart-rate monitoring in children. *Medicine and Science in Sports and*

*Exercise*, 25(3), 389-395.

Dyer, J. B., & Crouch, J. G. (1987). Effects of running on mood: a time series study.

*Perceptive Motor Skills*, 64, 783-789.

Eaton, D. J., Kann, L., & Kinchen, C. (2006). Youth risk behavior surveillance-

United States. *MMWR*, 55, 1-108.

Eckel, R. H., & Krauss, R. M. (1998). American Heart Association Call to Action:

Obesity as a Major Risk Factor for Coronary Heart Disease *Circulation*, 97,

2099-2100.

Eisenmann, J. C. (2004). Physical activity and cardiovascular disease risk factors in

children and adolescents: an overview. *Canadian Journal of Cardiology*, 20,

295-301.

Ekelund, U., Neovius, M., Linne, Y., Brage, S., Wareham, N. J., & Rossner, S. (2005).

Association between physical activity and fat mass in adolescents: The

Stockholm Weight Development Study. *American Journal of Clinical*

*Nutrition*, 81, 355-360.

Ekelund, U., Poortvliet, E., Nilsson, A., Yngve, A., Holmberg, A., & Sjostrom, M.

(2001). Physical activity in relation to aerobic fitness and body fat in 14- to

15-year-old boys and girls. *European Journal of Applied Physiology*, 85,

195-201.

Eston, R. G., Rowland, T. W., & Ingledeu, D. K. (1998). Validity of heart rate,

pedometry and accelerometer for prediction the energy cost of children's

activities. *Journal of Applied Physiology*, 84(1), 362-371.

Evans, J., Lopez, S., Duncan, M., & Evans, M. (1987). Some thoughts on the political

and pedagogical implications of mixed sex groupings in the physical

education curriculum. *British Educational Research Journal*, 13(1), 59-71.

Eve, N., & Williams, D. (2000). Multistage fitness test in secondary schools- advice

on safety. *Bulletin of Physical Education*, 36(2), 110-114.

Ewles, L., & Simnett, I. (1999). *Promotion Health. A practical guide* (4 ed.). Bristol: Bailliere Tindall.

Fairclough, S., & Stratton, G. (1997). PE curriculum and extra curriculum time in schools in the NW of England. *British Journal of Physical Education*, 28(3), 21-24.

Fairclough, S., Stratton, G., & Baldwin, G. (2002). The contribution of secondary school physical education to lifetime physical activity. *Europe Physical Education Review*, 8(1), 69-84.

Fairclough, S. J., & Stratton, G. (2005). 'Physical education makes you fit and healthy'. Physical education's contribution to young people's physical activity levels *Health Education Research*, 20(1), 14-23.

Fehily, A., Coles, R., Evans, W., & Elwood, P. (1992). Factors affecting bone density in young adults. *American Journal of Clinical Nutrition*, 56, 579-586.

Ferguson, R., Keating, X. D., Guan, J., Chert, L., & Bridges, D. (2007). California secondary teachers' attitudes toward the FITNESSGRAM. *Journal of Teaching in Physical Education*, 26, 159-173.

Fitts, W. H., & Warren, W. L. (1996). *Tennessee Self-Concept Scale (TSCS:2)*. Los Angeles: Western Psychological Services.

Fjortoft, I. (2000). Motor Fitness in Pre-Primary School Children: The EUROFIT Motor Fitness Test Explored on 5-7 Year-Old Children. *Pediatric Exercise Science*, 12, 424-436.

Fleury, J., & Lee, S. M. (2006). The social ecological model and physical activity in African American women. *American Journal of Community Psychology*, 37(1/2), 129-140.

Fogelholm, M., Stigman, S., Huisman, T., & Metsamuuronen, J. (2007). Physical

fitness in adolescents with normal weight and overweight. *Scandinavian Journal of Medicine & Science in Sports*

Fox, K. (2007). Commentary. *Pediatric Exercise Science, 19*, 125-127.

Fox, K. R. (1991). Physical Education and its Contribution to Health and Well-Being.

In N. Armstrong (Ed.), *New Direction in Physical Education*.

Fox, K. R., & Biddle, S. (1986). Health related fitness testing in schools: instruction and problems of interpretation. *The Bulletin of Physical Education, 22*, 54-64.

Fox, K. R., Cooper, A., & McKenna, J. (2004). The school and promotion of children's health-enhancing physical activity: perspectives from the United Kingdom. *Journal of Teaching Physical Education, 23*, 336-355.

Frazer, L., & Lawley, M. (2000). *Questionnaire design and administration: a practical guide*. Milton: John Wiley & Sons Australia. Ltd.

Freedman, D., Dietz, W. H., Srinivasan, S. R., & Berenson, G. S. (1999). The relation of overweight to cardiovascular risk factors among children and adolescents: the Bogalusa Heart Study. *Pediatrics, 103*, 1175-1182.

Freedson, P. S. (1991). Electronic Motion Sensors and Heart Rate as Measures of Physical Activity in Children. *Journal of School Health, 61*(5), 220-223.

Freedson, P. S., Cureton, K. J., & Heath, W. (2000). Status of field-based fitness testing in children and youth. *Preventive Medicine, 31*, S77-85.

Freedson, P. S., & Rowland, T. W. (1992). Youth activity versus youth fitness: Let's redirect our efforts. *Research Quarterly of Exercise and Sport, 63*, 133-136.

Fuentes, R. M., Notkola, I. L., Shemeikka, S., Tuomilehto, J., & Nissinen, A. (2003). Tracking of body mass index during childhood: a 15-year prospective population-based family study in eastern Finland. *International Journal of Obesity and Related Metabolic Disorders, 27*, 716-721.

Gallahue, D. (1982). *Developmental Movement Experiences for Children*. New York:

Collier Macmillan.

- Garcia, A. W., & Zakrajsek, J. S. (2000). Evaluation of the Canadian Aerobic Fitness Test With 10- to 15- Year-Old Children. *Pediatric Exercise Science*, 12, 300-311.
- Godin, G., & Shephard, R. J. (1984). Psychosocial factors influencing intentions to exercise of young students from grades 7 to 9. *Research Quarterly of Exercise and Sport*, 57, 41-52.
- Goran, M. I. (1998). Measurement Issues Related to Studies of Childhood Obesity: Assessment of Body Composition, Body Fat Distribution, Physical Activity, and Food Intake. *Pediatrics*, 101, 505-518.
- Gordon-Larsen, P., Nelson, M. C., Page, P., & Popkin, B. M. (2006). Inequality in the built environment underlies key health disparities in physical activity and obesity. *Pediatrics*, 117(2), 417-424.
- Gorely, T. (2005). The determinations of physical activity and inactivity in young people In L. Cale & J. Harris (Eds.), *Exercise and Young People. Issues, implications and initiatives* (pp. 81-102). Basingstoke: Palgrave Macmillan.
- Gottlieb, N. H., & Chen, M.-S. (1985). Socio-cultural correlates of childhood sporting activities: the is implications for heart health. *Social Science and Medicine*, 21, 533-539.
- Graham, G., Holt-Hale, S., & Parker, M. (1998). *Children moving* (4th ed.). Mountain View, CA.: Mayfield.
- Gratton, C., & Jones, I. (2004). *Research methods for sport studies*. London: Rutledge.
- Green, J., & Thorogood, N. (2004). *Qualitative Methods for Health Research*. London: SAGE.
- Green, K. (2000). *Philosophies, ideologies and the practice of physical education*.

Unpublished PhD, University of Leicester, Leicester.

Green, L. W., & Kreuter, M. W. (1999). *Health promotion planning: an educational and ecological approach. Volume 3. Mountain view.* CA: Mayfield: McGraw-Hill

Gregory, J., & Lowe, S. (2000). *National Diet and Nutrition Survey: Young People Aged 4 to 18 Years.* London: The Stationery Office.

Grimston, S. K., Willows, N. D., & Haniey, D. A. (1993). Mechanical loading regime and its relationship to bone mineral density in children. *Medicine Science of Sports and Exercise*, 25, 1203-1210.

Gruber, J. J. (1986). Physical activity and self-esteem development in children: a meta-analysis. In G. Stull & H. Eckert (Eds.), *Effects of physical activity on children* (pp. 330-348). Champaign, IL: Human Kinetic.

Gyuresik, N. C., Spink, K. S., Bray, S. R., Chad, K., & Kwan, M. (2006). An ecologically based examination of barriers to physical activity in students from grade seven through first-year university. *Journal of Adolescent Health*, 38, 704-711.

Hagberg, J. M., Ehsani, A. A., Goldring, D., Hernandez, A., Sinacore, D. R., & Holloszy, J. O. (1984). Effect of weight training on blood pressure and hemodynamics in hypertensive adolescents. *Journal of Pediatrics*, 104, 147-151.

Hager, R. L., Tucker, L. A., & Seljaas, G. T. (1995). Aerobic fitness, blood lipids and body fat in children. *American Journal of Public Health*, 85(12), 1702-1706.

Hakanen, M., Lagstrom, H., Kaitosarri, T., Niinikoski, H., Nanto-Salonen, K., & Jokinen, E. (2006). Development of overweight in an atherosclerosis prevention trial starting in early childhood: The STRIP study. *International Journal of Obesity*, 30, 618-626.

- Harrell, J. S., McMurray, R. G., Bangdiwala, S. I., Frauman, A. C., Gansky, S. A., & Bradley, C. B. (1996). Effects of a school-based intervention to reduce cardiovascular disease risk factors in elementary-school children: The Cardiovascular Health in Children (CHIC) Study. *Journal of Pediatrics*, 128, 797-805.
- Harrington, H. (1994). Teaching and Knowing. *Journal of Teacher Education*, 45 (3), 190-198.
- Harris, J. (1995). Physical education: a picture of health? *British Journal of Physical Education*, 26(4), 25-32.
- Harris, J. (1997b). *Physical Education: A Picture of Health? The Implementation of Health-Related Exercise in the National Curriculum in Secondary School in England*. Unpublished doctoral thesis, Loughborough University.
- Harris, J. (2000). *Health-Related Exercise in the National Curriculum: Key stages 1 to 4*: Human Kinetic.
- Harris, J., & Cale, L. (1997). How healthy is school PE? A review of the effectiveness of health-related physical education programmes in schools. *Health Education Journal*, 56, 84-104.
- Harris, J., & Cale, L. (2006). A review of children's fitness testing. *Europe Physical Education Review*, 12(2), 201-225.
- Harris, J., & Cale, L. (2007). Children's fitness testing: A feasibility study. *Health Education Journal*, 66(2), 153-172.
- Harris, J., & Elbourn, J. (1994). Measure for measure. *Sports teacher*, AUTUMN, 11-15.
- Harro, M., & Ridloch, C. (2000). Physical activity. In N. Armstrong & W. Van Mechelen (Eds.), *Paediatric Exercise Science and Medicine* (pp. 77-84). Oxford: Oxford University Press.



- Harter, S. (1985). *Manual for the Self-Perception Profile for Children*. Denver, CO: University of Denver.
- Health Education Authority (HEA). (1997). *Young People and Physical Activity. A Literature Review*. London: HEA.
- Health Education Authority (HEA). (1998). *New Recommendations for Promotion Health-enhancing Physical Activity with Young People (5-18 yrs)*. London: HEA.
- Health Education Council (HEC). (1978). *Look After Yourself Campaign*: HEC.
- Hellison, D. R., & Jemplin, T. J. (1991). Curriculum Models in Physical Education. In D. R. Hellison & T. J. Jemplin (Eds.), *A Reflective Approach to Teaching Physical Education* (pp. 43-54): Human Kinetic.
- Heyward, V. H. (1998). Practical body composition assessment for children, adults, and older adults. *International Journal of Sports Nutrition*, 8, 285-307.
- Hilke, E. V. (1990). *Cooperative Learning*. Bloomington, IN: Phi Delta Kappa Education Foundation.
- Hilyer, J. C., Wilson, D. C., Dillon, C., Caro, L., Jenkins, C., Spencer, W. A., et al. (1982). Physical fitness training and counseling at treatment for youth offenders. *Journal Council Psychology*, 29, 292-303.
- Ho, Y. R., Chang, Y. T., Pong, H. S., Tseng, S. T., & Yeah, S. G. (2009). *The History of Taiwanese Education*. Taipei: Lei Wen Cultural.
- Hoeger, W. W. K., & Hoeger, S. A. (1995). *Lifetime physical fitness and wellness: a personalized plan*. Englewood, CO: Morton.
- Holder, M. D., & Coleman, B. (2008). The contribution of temperament, popularity, and physical appearance to children's happiness. *Journal of Happiness Study*, 9, 279-302.
- Holloway, J. B., Beuter, A., & Duda, J. L. (1988). Self-efficacy and training for

- strength in adolescent girls. *Journal Applied Soc. Psych.*, 18, 699-719.
- Hopple, C., & Graham, G. (1995). What children think, feel and know about physical fitness testing. *Journal of Teaching in Physical Education*, 14(4), 408-417.
- Hopple, C. J. (1992). Children's perceptions of physical tests. *Teaching Elementary Physical Education*, 3(2), 10-11.
- Hsu, W. C., Chou, W. S. (2008). Social support - the influence of parents' attitude towards children's perspective of sports participation. *Chinese Physical Education*, 22(3), 50-56.
- Hu, L., McAuley, E., & Elavsky, S. (2005). Does the Physical Self-Efficacy Scale Assess self-efficacy or self-esteem? *Journal of Sport and Exercise Psychology*, 27, 152-170.
- Hung, C, L (2006). An investigation of the relationship among attitude towards exercise participation, health conditions and obstacles of exercise participation on the elementary school children. Unpublished Master Thesis, National Taiwan Sports University, Taiwan.
- Jacobs, R. H., Reinecke, M. A., Gollan, J. K., & Kane, P. (2008). Empirical evidence of cognitive vulnerability for depression among children and adolescents: A cognitive science and developmental perspective. *Clinical Psychology Review*, 28, 759-782.
- Janz, K. F., Witt, J., & Mahoney, L. T. (1995). The stability of children's physical activity as measured by accelerometer and self-report. *Medicine and Science in Sports and Exercise*, 27, 1326-1332.
- Jouret, B., Ahluwalia, N., Cristini, C., Dupuy, M., Negre-Pages, L., Grandjean, H., Tauber, M. (2007). Factors associated with overweight in preschool-age children in southwestern France. *American Journal of Clinical Nutrition*. 85: 1643-1649
- Joyce, B., & Weil, M. (1972). *Models of teaching*. NJ: Prentice-Hall.

- Kandel, I. L. (1970). *Comparative Education*. Westport: Greenwood Press.
- Katz, J. (1997). Studying populations. In J. Katz & A. Peberdy (Eds.), *Promoting Health-Knowledge and Practice* (pp. 213-230). Bristol: The Open University.
- Katz, J., & Peberdy, A. (1997). Theories and models in health promotion. In J. Katz & A. Peberdy (Eds.), *Promotion Health Knowledge and Practice* (pp. 75-88). Bristol: The Open University.
- Keaton, D. K., Kann, L., Okoro, C. A., & Collins, J. (2003). Selected Health Status Indicators and Behaviours Young Adults, United States-2003. *American Journal of Health Education*, 38(2), 66-75.
- Keller, F., & Sherman, J. G. (1974). *The Keller Plan handbook*. Menlo Park, CA: W.A.Benjamin.
- Kelly, L. A., Reilly, J. J., Jackson, D. M., Montgomery, C., Grant, S., & Paton, J. Y. (2007). Tracking physical activity and sedentary behavior in young children. *Pediatric Exercise Science*, 19, 51-60.
- Kemper, H. C. G. (2000). Physical activity, physical fitness and bone health. In N. Armstrong & W. Mechelen (Eds.), *Paediatric exercise science and medicine*. New York: Oxford University Press.
- Kemper, H. C. G., & Koppes, L. L. J. (2006). Linking physical activity and aerobic fitness: Are we active because we are fit, or are we fit because we are active? *Pediatric Exercise Science*, 18, 173-181.
- Kirk, D. (1988). *Physical Education and Curriculum Study: A Critical Introduction*. London: Croom Helm.
- Kistner, J. A., David-Ferdon, C. F., Lopez, C. M., & Joiner, T. E. (2007). Ethnic and sex differences in children's depressive symptoms. *Journal of Clinical Child Psychology*, 36, 171-181.
- Klesges, R. C., Coates, T. J., Moldenjauer-Klesges, L. M., Holzer, B., Gustavson, J.,

- & Barnes, J. (1984). The FATS: and observational system for assessing physical activity in children and associated parent behaviour. *Behavioural Assessment*, 6, 333-345.
- Kohl, H. W., Fulton, J. E., & Caspersen, C. J. (2000). Assessment of physical activity among children and adolescents: a review and synthesis. *Preventive Medicine*, 31, S54-76.
- Kowalski, K. C., Crocker, P. R. E., & Kowalski, C. J. (1997). Convergent validity of the physical activity questionnaire for adolescents. *Pediatric Exercise Science*, 31(342-52).
- Kvale, S. (1996). *Interviews*. London: Sage Publications.
- La Greca, A. M., & Lopez, N. (1998). Social anxiety among adolescents: Linkages with peer relations and friendships. *Journal of Abnormal Child Psychology*, 26, 83-94.
- LaGrange, B., Cole, D. A., Dallaire, D. H., Ciesla, J. A., & Pineda, A. Q. (2008). Developmental change in depressive cognitions: A longitudinal evaluation of the cognitive triad inventory for children. *Psychological Assessment*, 20(3), 217-226.
- Lau, P. W. C., Cheung, M. W. L., & Ransdell, L. B. (2008). A structural equation model of the relationship between body perception and self-esteem: Global physical self-concept as the mediator. *Psychology of Sport and Exercise*, 9, 493-495-499.
- Le Masurier, G. C., Beighle, A., Corbin, C. B., Darst, P. W., Morgan, C., Pangrazi, R. P., et al. (2005). Pedometer-determined physical activity levels of youth. *Journal of Physical Activity and Health*, 2, 159-168.
- Leger, L., & Thivierge, M. (1988). Heart rate monitors: Validity, stability and functionality. *Physician and Sports Medicine*, 16, 143-151.

- Lehtonen-Veromaa, L., Mottonen, T., Irjala, K., Nuotio, I., Leino, A., & Viikari, J. (2000). A 1-year prospective study on the relationship between physical activity, markers of bone metabolism, and bone acquisition in prepubertal girls. *Journal of Clinical Endocrinological Metabolic*, 85, 3726-3732.
- Lin, K. F., & Lou, S. U. (2003). *Health and physical education curriculum- the theory and activity design*. Taipei: Guanshei
- Liu, Y. L. (2008). Youth fitness testing: if the "horse" is not dead, what should we do? *Measurement in Physical Education & Exercise Science*(July-Sept).
- Livingstone, M. B. E. (1997). Heart-rate monitoring: the answer for assessing energy expenditure and physical activity in population studies? *British Journal of Nutrition*, 78, 869-871.
- Livingstone, M. B. E., Coward, A. W., Perentice, A. M., Davis, P. S. W., Strain, J. J., & McKenna, P. G. (1992). Daily energy expenditure in free-living children: comparison of heart rate monitoring with the doubly labeled water method. *American Journal of Clinical Nutrition*., 56, 343-352.
- Lobstein, T., James, W. P. T., & Cole, T. (2003). Increasing levels of excess weight among children in England. *International Journal of Obesity*, 27, 1136-1138.
- Lohman, T. G., Houtkooper, L., & Going, S. B. (1997). Body fat measurement goes high-tech. *ACSM's Health Fitness Journal*, 1(1), 30-35.
- Lopes, V. P., Casques, C. M. S., Maia, J. A. R., & Ferreira, J. C. V. (2007). Habitual physical activity levels in childhood and adolescence assessed with accelerometry. *Journal of Sports Medicine and Physical Fitness*, 47, 217-222.
- Luc, V., Johan, L., Renaat, P., Martine, M., Wim, H., Thierry, T., et al. (2005 ). How to assess physical activity? How to assess physical fitness? *European Journal of Cardiovascular Prevention & Rehabilitation*, 12(2), 102-114
- Machiavelli, N. (1532). *The Prince*.

- Maffeis, C., & Tatò, L. (2001). Long-Term Effects of Childhood Obesity on Morbidity and Mortality. *Hormone Research*, 55(1), 42-45.
- Malina, R. M. (1986). Growth of muscle tissue and muscle mass. In F. Falkner & J. M. Tanner (Eds.), *Human Growth* (Vol. 2, pp. 77-99). New York: Plenum Press.
- Malina, R. M. (1989). Tracking of physical fitness and performance during growth. In G. Beunen, J. Ghesquiere, R. Reybrouck & A. L. Clasessens (Eds.), *Children and Exercise XIV* (pp. 1-10). Stuttgart, Enke,.
- Malina, R. M. (1996). Tracking of physical activity and physical fitness across a lifespan. *Research Quarterly for Exercise and Sport*, 67, 48-57.
- Marcus, B. H., & Forsyth, L. H. (1999). How are we doing with physical activity? *American Journal of Health Promotion*, 14, 118-124.
- Marcus, B. H., & Forsyth, L. H. (2003). *Motivating people to be physically active*. Champaign, IL: Human Kinetics.
- Marsh, H. W. (1996). Physical Self-Description Questionnaire: stability and discriminant validity. *Research Quarterly for Exercise and Sport*, 67, 249-264.
- Marsh, H. W., Marco, I. T., & Acby, F. H. (2002). Cross-cultural validity of the Physical Self-Description Questionnaire: Comparison of factor structures in Australia, Spain, and Turkey. *Research Quarterly for Exercise and Sport*, 73, 257-270.
- Marsh, H. W., Richards, G. E., Johnson, S., Roche, L., & Tremayne, P. (1994). Physical Self-Description Questionnaire: Psychometric properties and a multitrait-multimethod analysis of relations to existing instruments. *Journal of Sport and Exercise Psychology*, 16, 270-305.
- Marshall, C., & Rossman, G. (1995). *Designing qualitative research* (2nd ed. Vol. Sage). Newbury Park.
- Mason, J. (1996). *Qualitative Researching*. London: SAGE Publications.

- McAuley, E., & Mihalko, S. L. (1998). Measuring exercise-related self-efficacy. In J. Duda (Ed.), *Advancements in sport and exercise psychology measurement* (pp. 371-382). Morgantown, WV: Fitness Information Technology.
- McBride, N., & Midford, R. (1999a). Encouraging schools to promote health: Impact of the western Australian school health project (1992-1995). *Journal of School Health, 69*(6), 220-225.
- McBride, N., & Midford, R. (1999b). Encouraging schools to promote health: impact of the western Australian school health project (1992-1995). *Journal of School Health, 69*(6), 220-225.
- McKay, H. A., MacLean, L., Petie, M., MacKelvie-O'Brien, K., Janssen, P., & Beck, T. (2005). "Bounce at the Bell": A novel program of short bounds of exercise improves proximal femur bone mass in early pubertal children. *British Journal of Sports Medicine, 39*, 521-526.
- McKenzie, G. (2001a, July, 17.). *Physical activity and health: school interventions*. Paper presented at the Abstracts of the 6th Annual Congress of the European College of Sports Science.
- McKenzie, T. L. (1991). Observational Measures of Children's Physical Activity. *Journal of School Health, 61*(5), 224-227.
- McKenzie, T. L. (2001b). Promoting physical activity in youth: focus on middle school environments. *Quest, 53*(3), 326-334.
- McKenzie, T. L., Marshall, S. J., Sallis, J. F., & Conway, T. L. (2000). Leisure-time physical activity in school environments: An observational study using SOPLAY. *Preventive Medicine, 30*, 70-77.
- Melanson, E. L., & Freedson, P. S. (1996). Physical activity assessment: a review of method. *Critical Review in Food Science and Nutrition, 36*, 385-396.
- Metzler, M. W. (2000). *Instructional Models for Physical Education*. Massachusetts:

Allyn and Bacon.

Metzler, M. W., & Sebolt, D. (1994). *Instructor's manual for the Personalized Sport Instruction Series*. Dubuque, IA: Kendall Hunt.

Mirwald, R. L., & Bailey, D. A. (1986). *Maximal aerobic power*. London, Ontario.: Sports Dynamics.

MMWR, M. a. M. W. R. (1997). *Guidelines for School and Community Programs to Promote Lifelong Physical Activity Among Young People (Recommendations and Reports)*. Atlanta, Georgia: U.S Department of Health and Human Services. Public Health Service. Centers for Disease Control and Prevention (CDC).

Morrow, J. R. (2007). Commentary. *Pediatric Exercise Science*, 19, 127-129.

Motl, R. W., Birnbaum, A. A., Kubik, M. Y., & Dishman, R. K. (2004). Naturally occurring changes in physical activity are inversely related to depressive symptoms during early adolescence. *Psychosomatic Medicine*, 66, 336-342.

Murphy, J. K., Alpert, B. S., Christman, J. V., & Walley, E. S. (1988). Physical fitness in children: a survey method based on parental report. *American Journal of Public Health*, 78, 708-710.

Mursi, P., Meesters, C., & Fijen, P. (2003). The Self-Perception Profile for Children: further evidence for its factor structure, reliability, and validity. *Personality and Individual Differences*, 35(2003), 1791-1802.

Must, A., & Anderson, S. E. (2006). Body mass index in children and adolescents: Considerations for population-based applications. *International Journal of Obesity*, 30, 590-594.

Must, A., Jacques, P. E., Dallal, G. E., Bajema, C. J., & Dietz, W. H. (1992). Long-term morbidity and mortality of overweight adolescents. *New England Journal of Medicine*, 327, 1350-1355.



- Mutrie, N., & Parfitt, G. (1998). Physical activity and its link with mental, social and moral health in young people. In S. J. H. Biddle, J. F. Sallis & N. Cavill (Eds.), *Young and active? Young people and health-enhancing physical activity: Evidence and implications* (pp. 49-68). London: Health Education Authority.
- Nagawa, A., & Ishiko, T. (1970). Assessment of aerobic capacity with special reference to sex and age of junior and senior high school students in Japan. *Japanese Journal of Physiology*, 20, 118-129.
- Naidoo, J., & Wills, J. (1998). *Health Promotion. Foundations for Practice* (5th ed.). London: Bailliere Tindall.
- Naughton, G. A., Carlson, J. S., & Greene, D. A. (2006). A challenge to fitness testing in primary schools. *Journal of Science and Medicine in Sport*, 9, 40-45.
- Naylor, P. J., & McKay, H. A. (2009). Prevention in the first place: schools a setting for action on physical activity. *British Journal of Sports Medicine*, 43(1): 10-13.
- NCC, N. C. C. (1990). *Curriculum Guidance 3: The Whole Curriculum*. London: HMSO.
- Nielsen, G. A., & Anderson, L. B. (2003). The association between high blood pressure, physical fitness, and body mass index in adolescents. *Preventive Medicine*, 36, 229-234.
- Noland, M., Danner, F., Dwalt, K., McFadden, M., & Kotchen, J. M. (1990). The measurement of physical activity in young children. *Research Quarterly of Exercise and Sport*, 61, 146-153.
- Noland, M. P., & Feldman, R. H. L. (1984). Factors related to the leisure exercise behaviour of returning women college students. *Health Education*, 15(2), 32-36.
- Norris, R., Carroll, D., & Cochrane, R. (1992). The effects of physical activity and

- exercise training on psychological stress and well-being in adolescent population. *Journal of Clinic Psychology*, 36(1), 55-65.
- Ntoumanis, M. (2001). *A Step-by Step Guide to SPSS for Sport and Exercise Studies*. London: Routledge.
- O'Hara, N. M., Baranowski, T., Simons-Morton, B. G., Wilson, S., & Parcel, G. S. (1989). Validity of the observation of children's physical activity. *Research Quarterly of Exercise and Sport.*, 60(1), 42-47.
- Office for Standards in Education (OFSTED). (1996). *Subjects and Standards. Issues for School Development Arising from OFSTED Inspection Findings. 1994/95. Key Stages 3 and 4 and Post 16*. London: HMSO.
- Ortega, F. B., Ruiz, J. R., Castillo, M. J., Moreno, L. A., Urzanqui, A., Gonzalez-Fross, M., et al. (2008). Health-related physical fitness according to chronological and biological age in adolescents. The AVENA study. *Epidemiology and Clinical Medicine*, 48, 371-379.
- Ostojic, S. M. (2006). Estimation of body fat in athletes: skinfolds v.s bioelectrical impedance. *Sports Medicine and Physical Fitness*, 46 (3), 442-6.
- Paluska, S., & Schwenk, T. (2000). Physical activity and mental health: Current concepts. *Sport Medicine*, 29, 167-180.
- Pangrazi, R. P. (2000). Promotion physical activity for youth. *The ACHPER Health Lifestyle Journal*, 47(2), 18-21.
- Pate, R. R. (1988). The evolving definition of physical fitness. *Quest*, 40, 174-179.
- Pate, R. R. (1991). Health-related measures of children's physical fitness. *Journal of School Health*, 61, 231-233.
- Pate, R. R. (1993). Physical activity assessment in children and adolescents. *Critical Reviews in Food Science and Nutrition*, 33, 321-326.
- Pate, R. R. (1994). Fitness Testing: Current Approaches and Purposes in Physical

- Education. In R. R. Pate & R. C. Hohn (Eds.), *Health and fitness through physical education* (pp. 119-127). Champaign, IL.: Human Kinetics.
- Pate, R. R., Baranowski, T., & Dowda, M. (1996). Tracking of physical activity in young children. *Medicine and Science in Sports and Exercise*, 28, 92-96.
- Pate, R. R., Dowda, M., O'Neill, J. R., & Ward, D. S. (2007). Change in physical activity participation among adolescent girls from 8th to 12th grade. *Journal of Physical Activity and Health*, 4, 3-16.
- Pate, R. R., Long, B. J., & Heath, G. (1994). Descriptive Epidemiology of Physical Activity in Adolescents. *Pediatric Exercise Science*, 6, 434-447.
- Pate, R. R., & O'Neill, J. R. (2009). After-school interventions to increase physical activity among youth. *British Journal of Sports Medicine*. 43(1): 14-18.
- Pate, R. R., Trost, S. G., Mullis, R., Sallis, J. F., Wechsler, H., & Brown, D. R. (2000). Community interventions to promote proper nutrition and physical activity in youth. *Preventive Medicine*, 31, S138-139.
- Penney, D., & Evans, J. (1999). *Politics, Policy and Practice in Physical Education*. London: E. & F. N. Spon.
- Perren, L. (1996). Resistance to change as a positive force: its dynamics and issues for management development *Career Development International* 1(4), 24-28.
- Physical Education Association (PEA). (1988). Health related fitness testing and monitoring in schools. A position statement on behalf of the PEA by its fitness and health advisory committee. *British Journal of Physical Education*, 19(4/5), 194-195.
- Physical Education Association of the United Kingdom (PEA UK). (1998). PEA UK Mission Statements. *British Journal of Physical Education*, 29(2), 4-7.
- Piers, E. (2002). *Piers-Harris 2 Children's Self-Concept Scale- Revised manual*. Los Angeles: Western Psychological Services.

- Plowman, S. A. (1992). Physical activity, physical fitness, and low back pain. *Exercise and Sport Science Review, 20*, 221-242.
- Plowman, S. A. (2005). Physical activity and physical fitness: weighing the relative importance of each. *Journal of Physical Activity and Health, 2*, 143-158.
- Plowman, S. A. (2007). Commentary. *Pediatric Exercise Science, 19*, 129-131.
- Poortvliet, E. (2003). The European Youth Heart Study (EYHS): an international study that addresses the multi0dimensional issues of CVD risk factors. *Forum Nutrition, 56*, 254-256.
- President's Council on Physical Fitness and Sports. (1987). *The Presidential Physical Fitness Award Program*. Unpublished manuscript, Washington, DC.
- Prochaska, J. O., & DiClemente, C. C. (1983). Stages and processes of self-change of smoking: Toward an integrative model of change. *Journal of Consulting and Clinical Psychology, 51*(390-395).
- Puhl, J. L. (1989). Energy expenditure among children: implication for childhood obesity I : resting and dietary energy expenditure. *Pediatric Exercise Science, 1*, 212-229.
- Puhl, J. L., Greaves, K., Hoyt, M., & Baranowski, T. (1990). Children's activity ration scale (CARS): description and calibration. *Research Quarterly of Exercise and Sport., 61*, 26-36.
- Puyau, M. R., Adolph, A. L., Vohra, F. A., & Butte, N. F. (2002). Validation and calibration of physical activity monitors in children. *Obesity Research, 10*, 150-157.
- Ratliffe, T., & Ratliffe, L. (1991). Partner self-test: encouraging on-task practice and accountability. *Teaching Elementary Physical Education, 2*(4), 14.
- Raudsepp, L., Neissaar, I., & Kull, M. (2008). Longitudinal stability of sedentary behaviors and physical activity during early adolescence. *Pediatric Exercise*

*Science*, 20, 251-262.

- Reed, J., Ainsworth, B. E., Wilson, D. W., Cooke, A., & Mixon, G. (2006). Awareness and used of community walking trails. *Preventive Medicine*, 39(5), 903-908.
- Reed, J., Malvern, L., Muthukrishnan, S., Hardy, R., & King, L. (2008). An ecological approach with primary-care counseling to promote physical activity. *Journal of Physical Activity and Health*, 5, 169-183.
- Reilly, J. J. (2006). Diagnostic accuracy of the BMI for age in paediatric. *International Journal of Obesity*, 30, 595-597.
- Rennie, K. L. & Jebb, S. A. (2005). National prevalence of obesity: Prevalence of obesity in Great Britain. *Obesity Reviews*, 6(1), 11-12.
- Rice, M. H., & Howell, C. C. (2000). Measurement of physical activity, exercise and physical fitness in children: issues and concerns. *Journal of Pediatric Nursing*, 15(3), 148-156.
- Riddoch, C., Anderson, L. B., & Wedderkopp, N. (2004). Physical activity levels and patterns of 9 and 15 year old European children. *Medicine and Science in Sports and Exercise*, 36, 86-92.
- Ridley, K., Dollman, J., & Olds, T. (2001). Development and validation of a computer delivered physical activity questionnaire (CDPAQ) for children. *Pediatric Exercise Science*, 13, 35-46.
- Rizzo, N., Ruiz, J., Hurtig-Wennlöf, A., Ortega, F., & Sjöström, M. (2006). Relationship of Physical Activity, Fitness, and Fatness with Clustered Metabolic Risk in Children and Adolescents: The European Youth Heart Study. *The Journal of Pediatrics*, 150(4), 388-394.
- Robinson, J. P., Shaver, P. R., & Wrightsman, L. S. (1991). *Measures of Personality and Social Psychological Attitudes*: Academic Press.
- Robson, C. (1993). *Real World Research*. Oxford: Blackwell.

- Rodriguez, G., Moreno, L. A., Blay, M. G., Blay, V. A., Fleta, J., Sarris, A., Bueno, M., AVENA-Zaragoza Study Group. (2005). Body fat measurement in adolescents: comparison of skinfold thickness equations with dual-energy X-ray absorptiometry. *European journal of Clinical Nutrition*, 59 (10), 1158-66.
- Roman, B., Serra-Majem, L., Ribas-Barba, L., Perez-Rodrigo, C., & Aranceta, J. (2008). How many children and adolescents in Spain comply with the recommendations on physical activity? *Journal of Sport Medicine and Physical Fitness*, 48, 380-387.
- Rosenshine, B. (1979). Content, time, and direct instruction. In H. J. Walberg & P. L. Peterson (Eds.), *Research on teaching: Concepts, findings, and implications*. (pp. 28-56). Berkeley, CA.: McCutchan.
- Rosenstock, I. M. (1974). The health belief model and preventative health behaviour. *Health Education Monographs*, 2(4), 355-387.
- Ross, J. G., & Gilbert, G. G. (1985). The national children and youth fitness study: A summary of findings. *Journal of Physical Education, Recreation and Dance*, 56, 45-50.
- Rowland, A. V., Eston, R. G., Lobo, L., Ingledew, D. K., Kwok, K. T., & Fu, F. H. (2002). Physical activity levels of Hong Kong Chinese children: relationship with body fat. *Pediatric Exercise Science*, 14, 286-296.
- Rowland, T. W. (1995). "The Horse is Dead: Let's Dismount.". *Pediatric Exercise Science*, 7, 117-120.
- Rowland, T. W. (1998). The biological basis of physical activity. *Medicine and Science in Sports and Exercise*, 30(3), 392-399.
- Rowland, T. W. (2002). Declining Cardiorespiratory Fitness in Youth: Fact or Supposition? *Pediatric Exercise Science*, 14, 1-8.
- Rowland, T. W. (2007). Fitness testing in the schools: Once more around the track.

*Pediatric Exercise Science, 19*, 113-114.

Rowland, T. W., & Freedson, P. S. (1994). Physical activity, fitness, and health in children: A close look. *Pediatrics, 93*, 669-672.

Rowlands, A. V., Eston, R. G., & Ingledew, D. K. (1997). Measurement of physical activity in children with particular reference to the use of heart rate and pedometry. *Sports Medicine, 24*(4), 258-272.

Rowlands, A. V., Powell, S. M., Eston, R. G., & Ingledew, D. K. (2002). Relationship between bone mass and habitual physical activity and calcium intake in 8 to 11 year old boys and girls. *Pediatric Exercise Science, 14*, 358-368.

Ruiz, J. R., Rizzo, N. S., Hurtig-Wennlof, A., Ortega, F. B., Warnberg, J., & Sjostrom, M. (2006). Relations of total physical activity and intensity to fitness and fatness in children: The European Youth Heart Study. *American Journal of Clinical Nutrition, 84*, 299-303.

Ryckman, R. M., Robbins, M. A., Thornton, B., & Cantrell, P. (1982). Development and validation of a Physical Self-Efficacy Scale. *Journal of Personality and Social Psychology, 42*, 891-900.

Safrit, M. (1990). The validity and reliability of fitness tests for children: A review. *Pediatric Exercise Science, 2*, 9-28.

Sallis, J., Buono, M. J., Roby, J. J., Carlsen, D., & Nelson, J. A. (1990). The Caltrac accelerometer as a physical activity monitor for school-age children. *Medicine and Science in Sports and Exercise, 22*, 698-703.

Sallis, J. F. (1991). Self-Report Measures of Children's Physical Activity. *Journal of School Health, 61*(5), 215-219.

Sallis, J. F., McKenzie, T. L., & Alcaraz, J. E. (1993). Habitual physical activity and health-related physical fitness in fourth-grade children. *American Journal of Diseases of Children., 147*, 890-895.

- Sallis, J. F., & Owen, N. (1997). Ecological models. In K. Glanz, F. M. Lewis & B. K. Rimer (Eds.), *Health behavior and health education: Theory, research, and practice* (2nd ed., pp. 403-424). San Francisco: Jossey-Bass.
- Sallis, J. F., & Owen, N. (1999). *Physical activity and behavioural medicine*. Thousand Oaks, CA: SAGE Publications.
- Sallis, J. F., & Patrick, K. (1994). Physical activity guidelines for adolescents: consensus statement. *Pediatric Exercise Science*, 6, 302-314.
- Saris, W. H. M. (1982). *Aerobic Power and Daily Physical Activity in Children*. Netherlands: Keipps Repro.
- Saris, W. H. M. (1985). The assessment and evaluation of daily physical activity in children: a review. *Acta Paediatrica Scandinavica*, 318, 37-48.
- Saris, W. H. M., Blair, S. N., Baak, M. A., Eaton, S. B., Davis, P. S., & Di Pietro, L. (2003). How much physical activity is enough to prevent unhealthy weight gain? Outcome of the IASO 1st Stock Conference and consensus statement. *Obesity Review*, 4, 101-114.
- Saunders, R., Pate, R. R., Felton, G., Dowda, M., Weinrich, M. C., Ward, D. S., et al. (1997). Development of Questionnaires to Measure Psychosocial Influences on Children's Physical Activity. *Preventive Medicine*, 26, 241-247.
- Schoeller, D. A. (1983). Energy expenditure from doubly labeled water: some fundamental considerations in humans. *American Journal of Clinical Nutrition*, 38, 999-1005.
- Schonfeld-Warden, N., & Warden, C. H. (1997). Pediatric obesity. An overview of etiologh and treatment. *Pediatric Clinics of North American*, 44, 339-361.
- Seefeldt, V., & Vogel, P. (1989). Physical fitness testing of children: A 30-years history of misguided efforts. *Pediatric Exercise Science*, 1, 295-302.
- Segerstrom, S. C., & Nes, L. S. (2007). Heart Rate Variability Reflects



Self-Regulatory Strength, Effort, and Fatigue *Psychological Science*, 18(3), 275-281.

Seidman, I. (2006). *Interviewing as Qualitative Research. A Guide for Researchers in Education and the Social Sciences* (3rd ed.). New York: Teachers College Press.

Shephard, R. J., & Lavallee, H. (1994). Changes of physical performance as indicators of the response to enhanced physical education. *Journal of Sports Medicine and Physical Fitness*, 34(4), 323-335.

Shephard, R. J., & Trudeau, F. (2000). The legacy of physical education: influences on adult lifestyle. *Pediatric Exercise Science*, 12, 34-50.

Shields, D. L. L., & Bredemeier, B. J. L. (1994). *Character development and physical activity*. Champaign, IL.: Human Kinetic.

Siedentop, D. (1998). What is sport education and how does it work? *Journal of Physical Education, Recreation & Dance*, 69(4), 18-20.

Silverman, A., Keating, X. D., & Phillips, S. R. (2008). A last impression: a pedagogical perspective on youth fitness testing. *Measurement in Physical Education & Exercise Science*, July-Sept.

Sirard, J. R., & Pate, R. R. (2001). Physical activity assessment in children and adolescents. *Sport Medicine*, 31(6), 439-454.

Slaughter, M. H., Lohman, T. G., & Boileau, R. A. (1984). Influence of maturation on relationship of skinfolds to body density: a cross-sectional study. *Human Biol.*, 56, 681-689.

Slavin, R. E. (1983). *Cooperative learning*. New York: Longman.

Sleap, M. (1990). Promotion health in primary school physical education. In N. Armstrong (Ed.), *New Directions in Physical Education* (pp. 17-36). Champaign, Ill: Human Kinetics.

- Slemenda, C. W., Miller, J. Z., Hui, S. L., Reister, T. K., & Johnston, C. C. J. (1991). Role of physical activity in the development of skeletal mass in children. *Journal of Bone Mineral Research*, 6, 1227-1233.
- Slemenda, C. W., Reister, T. K., Hui, S. L., Miller, J. Z., Christian, J. C., & Johnston, C. C. J. (1994). Influences on skeletal mineralization in children and adolescents: evidence for varying effects of sexual maturation and physical activity. *Journal of Pediatric*, 125, 201-207.
- Smith, R. A., & Biddle, S. (1995). Psychological factors in the promotion of physical activity. In S. Biddle (Ed.), *European Perspectives on Exercise and Sport Psychology* (pp. 85-108). Champaign, IL: Human Kinetic.
- Sofranko, A. J., & Nolan, M. F. (1972). Early life experience and adult sports participation. *Journal of Leisure Research*, 4, 6-18.
- Sonstroem, R. J., & Morgan, W. P. (1989). Exercise and self esteem: rational and model. *Medicine Science of Sports and Exercise*, 21, 329-337.
- Soos, I., Liukkonen, J., & Thomson, R. W. (2007). Health promotion and healthy lifestyles: motivating individuals to become physically active. In J. Merchant, B. L. Griffin & A. Charnock (Eds.), *Sport and Physical Activity - The Role of Health Promotion*: Palgrave Marmillan.
- Sparkes, A. C. (1989). Health Related Fitness: an example of innovation without change. *The British Journal of Physical Education*, 20(2), 60-63.
- Sparkes, A. C. (1990). The problem of real change. In A. C. Sparkes (Ed.), *Curriculum Change and Physical Education. Towards a micropolitical understanding* (pp. 3-6): Deakin University.
- Speiser, P. W., Rudolf, M. C. J., Anhalt, H., Camacho-Hubner, C., Chiarelli, F., & Eliakim, A. (2005). Consensus statement: Childhood obesity. *Journal of Clinical Endocrinology and Metabolism*, 60, 1871-1887.

- Spence, J. C., & Lee, R. E. (2003). Toward a comprehensive model of physical activity. *Psychology of Sport and Exercise, 4*, 7-24.
- Sport England. (2001). *Young People and Sport in England 1999*. London: Sport England.
- Stamatakis, E, Primatesta, P, Chinn, S, Rona, R, Falaschetti, E (2005). Overweight and obesity trends from 1974 to 2003 in English children: what is the role of socioeconomic factors? *Archives of Disease in Children, 90*: 999-1004
- Steinbeck, K. S. (2001). The importance of physical activity in the prevention of overweight and obesity in childhood: a review and a opinion. *Obesity Review, 2*, 117-130.
- Steinberger, J., Jacobs, D. R., Raatz, S., Moran, A., Hong, C. P., & Sinaiko, A. R. (2005). Comparison of body fatness measurements by BMI and skinfolds vs. dual energy X-ray absorptiometry and their relation to cardiovascular risk factors in adolescents. *International Journal of Obesity, 29*, 1346-1352.
- Stensel, D. J., Gorely, T., & Biddle, S. (2008). Youth Health Outcomes. In A. L. Smith & S. Biddle (Eds.), *Youth Physical Activity and Sedentary Behavior*. Champaign, IL: Human Kinetics.
- Storch, E. A., & Masia-Warner, C. (2004). The relationship of peer victimization to social anxiety and loneliness in adolescent females. *Journal of Adolescence, 27*, 351-362.
- Stratton, G., Fairclough, S. J., & Ridgers, N. D. (2008). Physical activity levels during the school day. In A. L. Smith & S. Biddle (Eds.), *Youth physical activity and sedentary behavior. Challenges and solutions*. Champaign, IL: Human Kinetics.
- Strauss, R. S., Rodzilsky, D., Burack, G., & Colin, M. (2001). Psychosocial correlates of physical activity in healthy children. *Archives of Pediatrics & Adolescent*

*Medicine*, 155, 897-902.

- Strong, W. B., Malina, R. M., Blimkie, C. J., Daniels, S. R., Dishman, R. K., & Gutin, B. (2005). Evidence based physical activity for school-age youth. *Journal of Pediatrics*, 146, 732-737.
- Sujatha, T., Shatrugna, V., Venkataramana, Y., & Begum, N. (2000). Energy expenditure on household, childcare and occupational activities of women from urban poor households. *British Journal of Nutrition*, 83(5), 497-503.
- Sullivan, J. E. (2001). Emotional outcome of adolescents and young adults with early and continuously treated phenylketonuria. *Journal of Pediatric Psychology*, 26(8), 477-484.
- Sun, D. X., Schmidt, G., & Teo-Koh, S. M. (2008). Validation of the RT3 accelerometer for measuring physical activity of children in simulated free-living conditions. *Pediatric Exercise Science*, 20, 181-197.
- Tatto, M. T. (1998). The influence of teacher education on teachers' beliefs about purposes of education, roles and practice. *Journal of Teacher Education*, 49(1), 66-77.
- Telama, R., Viikari, J., Valimaki, I., Siren-Tiusanen, H., Akerblom, H. K., & Uhari, M. (1985). Atherosclerosis precursors in Finnish children's and adolescents' leisure time physical activity. *Acta Paediatrica Scandinavica*, 318, 169-180.
- The Cooper Institute. (2007). *FITNESSGRAM/ACTIVITYGRAM 9.0. Test Administration Manual*. Champaign, IL.: Human Kinetics.
- The NHS Information Centre-Lifestyle Statistics. (2009). *Statistics on obesity, physical activity and diet: England: The Health and Social Care Information Centre*.
- The School Government Publishing Company Limited. (2004). *The Education Authorities Directory*. Retrieved from.

- Thomas, J. R., Nelson, J. K., & Silverman, S. J. (2005). *Research methods in physical activity* (5th ed.). Champaign, IL: Human Kinetics.
- Thomas, N. E., & Williams, D. R. R. (2008). Inflammatory factors, physical activity, and physical fitness in young people. *Scandinavia Journal of Medicine Science of Sports*, *18*, 534-556.
- Timperio, A., Crawford, D., Telford, A., & Salmon, J. (2004). Perceptions about the local neighborhood and walking and cycling among children. *Preventive Medicine*, *38*, 39-47.
- Tolfrey, K., Jones, A. M., & Campbell, I. G. (2000). The effect of aerobic exercise training on the lipid-lipoprotein profile of children and adolescents. *Sports Medicine*, *29*, 99-112.
- Tomkinson, G. R. (2007). Global changes in anaerobic fitness test performance of children and adolescents (1958-2003). *Scandinavian Journal of Medicine & Science in Sports*, *17*(5), 497-507
- Tomkinson, G. R., & Olds, T. S. (2007). Secular Changes in Pediatric Aerobic Fitness Test Performance: The Global Picture. In G. R. Tomkinson & T. S. Olds (Eds.), *Pediatric Fitness. Secular Trends and Geographic Variability*. Basel: Karger.
- Tomson, L. M., Pangrazi, R. P., Friedman, G., & Hutchison, N. (2003). Childhood depressive symptoms, physical activity and health related fitness. *Journal of Sport and Exercise Psychology*, *25*, 419-439.
- Tones, K., & Tilford, S. (1994). Health education : models and ideologies. In K. Tones & S. Tilford (Eds.), *Health Education, Effectiveness, efficiency and equity* (2 ed.). London: Chapman and Hall.
- Tortolero, S. R., Taylor, W. C., & Murray, N. G. (2000). Physical activity, physical fitness and social, psychological and emotional health. In N. Armstrong & W. Mechelen (Eds.), *Paediatric exercise science and medicine* (pp. 273-291).

New York: Oxford University Press.

- Treiber, F. A., Musante, L., Hartdagan, S., Davis, H., Levy, J., & Strong, W. B. (1989). Validation of a heart rate monitor for children in laboratory and field settings. *Medicine and Science in Sports and Exercise*, 21, 338-342.
- Tremblay, M. S., Inman, J. W., & Wilms, J. D. (2000). The relationship between physical activity, self-esteem, and academic achievement in 12-year-old children. *Pediatric Exercise Science*, 12, 312-323.
- Trost, S. G. (2000). Objective measurement of physical activity in youth: current issues, future directions. *Exercise Sport Science Review*, 29, 32-36.
- Trost, S. G., Ward, D. S., Moorehead, S. M., Watson, P. D., Riner, W., & Burke, J. R. (1998). Validity of the computer science and applications (CSA) activity monitor in children. *Medicine and Science in Sports and Exercise*, 30, 629-633.
- Twisk, J. W. R. (2000). Physical activity, physical fitness and cardiovascular health. In N. Armstrong & W. Van Mechelen (Eds.), *Paediatric Exercise Science and Medicine* (pp. 253-263). Oxford: Oxford University Press.
- Van Dalen, D., & Bennett, B. (1971). *A world history of physical education: Cultural, philosophical, comparative* (2nd ed.). Englewood Cliffs, NJ: Prentice Hall.
- Van Mechelen, W., & Kemper, H. C. G. (1995). Body growth, body composition, and physical fitness. In H. C. G. Kemper (Ed.), *The Amsterdam growth study* (pp. 52-85). Champaign: Human Kinetic.
- Vanhala, M., Vanhala, P., Kumpusalo, E., Halonen, P., & Takala, J. (1998). Relation between obesity from childhood to adulthood and the metabolic syndrome; population based study. *British Medical Journal*, 317, 319.
- Vanhees, L. d. L., Johanb; Philippaerts, Renaate; Martens, Martinea; Huygens, Wim; Troosters, Thierrya; Beunen, Gastonb (2005 ). How to assess physical activity?

How to assess physical fitness? *European Journal of Cardiovascular Prevention & Rehabilitation*, 12(2), 102-114

Vanreusel, B., Renson, R., Beunen, G., Clasesens, A., Lefevre, J., & Lysens, R. (1993). Adherence to sport from youth to adulthood: a longitudinal study on socialization. In W. Duquet, P. de Knop & L. Ballaert (Eds.), *Youth Sport*. (pp. 99-109). Brussels, Belgium,: VUB Press,.

Vicente-Rodriguez, G. (2006). How does exercise affect bone development during growth? *Sport Medicine*, 36, 561-569.

Wake, M., Nicholson, J. M., Hardy, P., Smith, K. (2007). Preschooler Obesity and Parenting Styles of Mothers and Fathers: Australian National Population Study. *Pediatrics* 120: e1520-e1527.

Wang, Y., Rimm, E. B., Stampfer, M. J., Willett, W. C., & Hu, F. B. (2005). Comparison of abdominal adiposity and overall obesity in predicting risk of type 2 diabetes among men. *American Journal of Clinical Nutrition*, 81, 555-563.

Wannamethee, S. G., & Shaper, A. G. (2001). Physical Activity in the Prevention of Cardiovascular Disease: An Epidemiological Perspective. *Sports Medicine*, 31(2), 101-114.

Warburton, D. E. R., Nicol, C. W., & Bredin, S. S. D. (2006). Health benefits of physical activity: the evidence. *Canadian Medical Association Journal* (174), 801-809.

Waring, M., Warburton, P., & Coy, M. (2007). Observation of children's physical activity levels in primary school: Is the school an ideal setting for meeting government activity targets? *European Physical Education Review*, 13(1), 25-40.

Watts, K., Jones, T. W., Davis, E. A., & Green, D. (2005). Exercise training in obese

- children and adolescents. *Sports and Medicine*, 35, 375-392.
- Webber, L. S., Osganian, S. K., Feldman, H. A., Wu, M., McKenzie, T. L., Nichaman, M., et al. (1996). Cardiovascular risk factors among children after a two and a half year intervention- The CATCH Study. *Preventive Medicine*, 25, 432-441.
- Wedderkopp, N., Froberg, K., Hansen, H. S., Riddoch, C., & Andersen, L. B. (2003). Cardiovascular risk factor cluster in children and adolescents with low physical fitness: the European Youth Heart Study (EYHS). *Pediatric Exercise Science*, 15, 419-427.
- Welk, G. J. (2008). The role of physical activity assessments for school-based physical activity promotion. *Measurement in Physical Education & Exercise Science*, July-Sept.
- Welk, G. J., Corbin, C. B., & Dale, D. (2000). Measurement issues in the assessment of physical activity in children. *Research Quarterly of Exercise and Sport*, 71(2), 59-73.
- Welk, G. J., Dzewaltowski, D. A., & Hill, J. L. (2004a). Comparison of the computerized ACTIVITYGRAM instrument and the Previous Day Physical Activity Recall (PDPAR) for assessing physical activity in children. *Research Quarterly for Exercise and Sport*, 75, 370-380.
- Welk, G. J., & Morrow, J. R. (2008). *FITNESSGRAM reference guide*. Dallas, TX: The Cooper Institute.
- Welk, G. J., Schaben, J. A., & Morrow, J. R. (2004b). Reliability of accelerometry-based activity monitors: a generalizability study. *Medicine and Science in Sports and Exercise*, 36, 1637-1645.
- Welk, G. J., & Wood, K. (2000). Physical activity assessments in physical education. A practical review of instruments and their use in the curriculum. *Journal of Physical Education, Recreation, and Dance*, 71(1), 30-40.



- Welten, D. C., Kemper, H. C. G., Post, G. B., Van Mechelen, W., Twisk, J., Lips, P., et al. (1994). Weight-bearing activity during youth is a more important factor for peak bone mass than calcium intake. *Journal of Bone Mineral Research*, 9, 1089-1096.
- Weltman, A., Janney, C., Rians, C. B., Strand, K., & Katch, F. I. (1987). The effects of hydraulic-resistance strength training on serum lipid levels in prepubescent boys. *American Journal of Diseases of Children*, 141, 77-780.
- Whitehead, J. R., Pemberton, C. L., & Corbin, C. B. (1990). Perspective on the physical fitness testing of children: The case for a realistic educational approach. *Pediatric Exercise Science*, 2, 111-123.
- Whitehead, M. (2000). Aims and an issue in physical education. In S. Capel & S. Piotrowski (Eds.), *Issues in Physical Education* (pp. 7-21). London: Routledge.
- Williams, P. T. (2001). Physical fitness and activity as separate heart disease risk factors: a meta-analysis. *Medicine and Science in Sports and Exercise*, 33(5), 754-761.
- World Health Organization (WHO). (1948). Constitution of the World Health Organization. *Chronicle of the World Health Organization*, 1, 1-2.
- World Health Organization (WHO). (1986). *WHO Health Promotion Glossary*. Geneva: WHO.
- Wright, C, Lakshman, R, Emmett, P, Ong, K K (2008). Implications of adopting the WHO 2006 Child Growth Standard in the UK: two prospective cohort studies. *Archives of Disease in Children*. 93: 566-569
- Xavier, G. F., Serge, B., & Laurent, B. (2006). Validity of the Polar S810 Heart Rate Monitor to Measure R-R Intervals at Rest. *Medicine & Science in Sports & Exercise*, 38(5), 887-893.

Yoesting, D. R., & Burkhead, D. L. (1973). Significance of childhood recreation experience on adult leisure behaviour. An explanatory analysis. *Journal of Leisure Research*, 5, 25-36.

Yu, G. G., Lee, A., Wirrell, E., Sherman, E. M. S., & Hamiwka, L. (2008). Health behavior in teens with epilepsy: How do they compare with controls? *Epilepsy & Behavior*, 13, 90-95.

<http://www.edu.tw> sourced date: 10.08.2008

[http://www.who.int/school\\_youth\\_health](http://www.who.int/school_youth_health) sourced date: 03.08.2009

<http://www.healthschool.gov.uk> sourced date: 22.09.2009

<http://www.bhf.org.tw> sourced date: 22.09.2009

<http://www.standards.dfes.gov.uk> sourced date: 14.08.2008

<http://www.fitness.org.tw> sourced date: 16.12.2008

<http://www.ceag.kh.edu.tw> sourced date: 24.09.2008

# Appendices

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**Health, Activity and Fitness Monitoring within  
the Secondary Curriculum in England**

**Section A**

**General Information**

1. **TYPE OF SCHOOL** (please tick **one** box only)

- State middle
  - State comprehensive
  - State grammar
  - Grant maintained middle
  - Grant maintained secondary
  - Independent
  - City Technology College
  - Specialist College
  - Other (please specify)
- 

2. **AGE RANGE** (please tick **one** box only)

- 9-13 years
  - 10-14 years
  - 11-14 years
  - 11-16 years
  - 11-18 years
  - 14-18 years
  - Other (please specify)
- 

3. **GENDER** (please tick **one** box only)

- All boys school
  - All girls school
  - Mixed sex school (all years)
  - Other (please specify)
-

**Section B**

**Monitoring Young People's Health within the School Curriculum**

1. Does your school or department monitor pupils' health YES  
NO

in any way within the curriculum?

If NO, please go straight to question 2.

If YES,

(a) Why is pupils' health monitored?

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(b) How is the information collected utilised?

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(c) In what area(s) of the curriculum is pupils' health monitored?

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(d) What aspects of pupils' health are monitored? (please tick all boxes that apply)

- Weight
- Height
- Body composition
- Cardiovascular health (heart rate; respiratory function)
- Blood pressure
- Mental health (e.g. stress, well-being)
- Other (please specify below)

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(e) What resources or equipment are used to monitor pupils' health?

(please tick all boxes that apply)

Heart rate monitors

Weighing scales

Spirometers/Peak flow meters

Blood pressure measures

Relaxation/ Stress measures

Other (please specify below)

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(f) How often is pupils' health monitored?

Occasionally (e.g. once during a key stage)

Once a year

Two or more times per year

(g) When is pupils' health typically monitored?

Beginning of year

Middle of year

End of year

**(The next question only applies if your school or department does not currently monitor pupils' health)**

2. Do you think that your school or department should monitor pupils' health? YES NO

Please give reasons for your answer

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**Section C**

**Monitoring Young People's Activity within the School Curriculum**

1. Does your school or department monitor pupils' activity in anyway within the curriculum? YES NO

If NO, please go straight to question 2.

If YES,

- (a) Why is pupil's activity monitored?

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- (b) How is the information collected utilised?

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- (c) In what area(s) of the curriculum is pupils' activity monitored?

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- (d) In which of the following ways is pupils' activity monitored?  
(please tick all boxes that apply)

- Questionnaire
- Activity diaries
- Registers
- Observation
- Pedometer (movement/ step counter)
- Accelerometer
- Heart rate monitoring
- Other (please specify below)

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(e) How often is pupils' activity monitored?

Occasionally (e.g. once during a key stage)

Once a year

Two or more times per year

(f) When is pupils' activity typically monitored?

Beginning of year

Middle of year

End of year

**(The next question only applies if your school or department does not currently monitor pupils' activity)**

2. Do you think your school or department should monitor pupils' activity?

YES NO

Please give reasons for your answer

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**Section D**

**Monitoring Young People's Fitness within the School Curriculum**

1. Does your school or department monitor pupils' fitness in anyway within the curriculum? YES NO

If NO, please go straight to question 2.

If YES,

(a) Why is pupils' fitness monitored?

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(b) How is the information collected utilised?

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(c) In what area(s) of the curriculum is pupils' fitness monitored?

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(d) Which of the follow components of physical fitness are monitored?  
(please tick all boxes that apply)

- Aerobic capacity/cardiorespiratory endurance/stamina
- Muscular strength/endurance
- Flexibility
- Body composition
- Power
- Agility
- Balance
- Speed
- Coordination
- Reaction time
- Other (please specify below)

(e) Which of the following methods or tests are used to monitor pupils' fitness?

(please tick all boxes that apply)

- Step test
- Time/distance run
- Multi-Stage Fitness Test ('bleep' test)
- Shuttle run
- Cycle ergometer test
- Treadmill test
- Sit and reach flexibility test
- Shoulder flexibility test
- Back flexibility test
- Sit-ups/curl-ups
- Pull-ups
- Push-ups
- Flexed arm hang
- Handgrip dynamometer
- Skinfold measurements
- WHR (waist-to-hip ratio)
- BMI (body mass index)
- Other (please specify below)

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(f) How often is pupils' fitness monitored?

- Occasionally (e.g. once during a key stage)
- Once a year
- Two or more times per year

(g) When is pupils' fitness typically monitored?

- Beginning of year
- Middle of year
- End of year

**(The next question only applies if your school or department does not currently monitor pupils' fitness)**

2. Do you think your school or department should monitor pupils' fitness? Please give reasons for your answer

YES    NO

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**Section E**

**Monitoring Health, Activity and Fitness within the School Curriculum**

1. Is health, activity and/or fitness monitoring a compulsory component of the PE curriculum for any of the following year groups? (please tick all boxes that apply)

	Health	Activity	Fitness
Year 7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Year 8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Year 9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Year 10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Year 11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Year 12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Year 13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If **NO**, do you feel health, activity and/or fitness monitoring should be a compulsory component of the PE curriculum for any year groups?

Please give reasons for your answer

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**(Questions 2-4 only apply if your school or department currently monitors young people's health, activity or fitness. If your school or department does not currently monitor young people's health, activity or fitness please go straight to Question 5)**

2. If your school or department monitors pupils' health, activity **and** fitness, which, if any, is given most emphasis?

- Health
- Activity
- Fitness
- All given equal emphasis

Please provide reasons

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If your school or department monitors only 1 or 2 of the above, please explain why this is.

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3. Generally how do your pupils respond to health, activity and/or fitness monitoring within the curriculum?

	Respond Positively	Respond Negatively	Neutral Response	Not Applicable
Health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Activity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fitness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. Is any of the health, activity or fitness information reported to parents either verbally or in a written report? (Please tick all boxes that apply)

- Health information
- Activity information
- Fitness information

5. Please comment on the extent to which you agree/disagree with the following statements.

	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
(a) Monitoring young people's health should be an important component of any PE programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- (b) Monitoring young people's activity is a waste of time.
- (c) More emphasis should be placed on monitoring young people's fitness within the PE curriculum.
- (d) It is desirable to monitor young people's health within the school curriculum.
- (e) Monitoring young people's activity is problematic within the school curriculum.
- (f) Too much time is spent on monitoring young people's fitness within the school curriculum.
- (g) Fitness testing merely distinguishes the mature and motivated pupils from the less mature and de-motivated.
- (h) Schools have a responsibility to monitor pupils' health, activity and fitness.
- (i) The way in which monitoring is carried out influences young people's attitudes towards their health, activity and fitness.
- (j) Fitness testing can be effective in promoting activity and fitness.
- (k) Promoting and monitoring activity is more important than promoting and monitoring fitness within the curriculum.
- (l) It is more appropriate to monitor health-related fitness than skill-related fitness.

6. Do staff use any texts to assist in monitoring health, physical activity and fitness?  
If yes, please provide brief details of the texts.

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7. The following questions apply to yourself, as Head of Physical Education:

Male      Female

(a) Are you male or female? (please tick the appropriate box)           

(b) How many years experience do you have of teaching Physical Education? \_\_\_\_\_

(c) How many years experience do you have as a Head of Physical Education? \_\_\_\_\_

FINALLY, THANK YOU VERY MUCH FOR SPENDING  
VALUABLE TIME  
COMPLETING THE QUESTIONNAIRE.

Please return the completed questionnaire in the  
self-addressed stamped envelope provided to:

Ming-Hung Chen  
School of Sport and Exercise Sciences  
Loughborough University  
LE11 3TU

By

**Friday 19<sup>th</sup> December 2003.**

If you have any comments to make about the questionnaire generally or  
about specific questions within it, please feel free to make these in the  
space below. Any suggestions for improving the questionnaire or  
increasing the response rate are most welcome.

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## Appendix B: Main Survey Questionnaire

# Health, Activity and Fitness Monitoring within the Secondary Curriculum in England

This questionnaire assumes that the curriculum for girls and for boys in your school is

similar. If this is not the case, you may want to complete two questionnaires, one that applies to the girls' curriculum, and the other to the boys' curriculum. If you are completing two separate questionnaires, please feel free to photocopy this one or contact me for a second questionnaire. Please also indicate whether the questionnaire applies to the girls' or the boys' curriculum.

There are 5 sections in this questionnaire:

**Section A:** General Information.

**Section B:** Monitoring Young People's Health.

**Section C:** Monitoring Young People's Activity.

**Section D:** Monitoring Young People's Fitness.

**Section E:** Monitoring Health, Activity and Fitness within Your School Curriculum

### Section A

### General Information

#### 4. TYPE OF SCHOOL (please tick **one** box only)

- State middle
- State comprehensive
- State grammar
- Grant maintained middle
- Grant maintained secondary
- Independent
- City Technology College
- Specialist College
- Other (please specify)

#### 5. AGE RANGE (please tick **one** box only)

- 9-13 years
- 10-14 years
- 11-14 years



- 11-16 years
  - 11-18 years
  - 14-18 years
  - Other (please specify)
- 

6. **GENDER** (please tick **one** box only)

- All boys school
  - All girls school
  - Mixed sex school (all years)
  - Other (please specify)
- 

**Section B**

**Monitoring Young People's Health**

***Health*** is a positive state of physical, mental and social well-being. It is much more than simply absence of illness or disease. It is a resource for everyday life.

1. Does your school or department monitor pupils' health in any way within the curriculum? YES NO

If **NO**, please go straight to question 2.  
 If **YES**,

(a) Why is pupils' health monitored?

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(b) How is the information collected utilised?

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(c) In what area(s) of the curriculum is pupils' health monitored?

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(d) What aspects of pupils' health are monitored? (please tick all boxes that apply)

- Weight
- Height
- Body composition
- Cardiovascular health (heart rate; respiratory function)
- Blood pressure
- Mental health (e.g. stress, well-being)
- Other (please specify below)

---

---

(e) What resources or equipment are used to monitor pupils' health? (please tick all boxes that apply)

- Heart rate monitors
- Weighing scales
- Spirometers/Peak flow meters
- Blood pressure measures
- Relaxation/ Stress measures
- Other (please specify below)

---

(f) How often is pupils' health monitored?

- Occasionally (e.g. once during a key stage)
- Once a year
- Two or more times per year

(g) When is pupils' health typically monitored?

- Beginning of year
- Middle of year
- End of year
- Various times of the year

**(The next question only applies if your school or department does not currently monitor pupils' health)**

3. Do you think that your school or department should monitor pupils' health? Please give reasons for your answer

	YES	NO
	<input type="checkbox"/>	<input type="checkbox"/>

---

## Monitoring Young People's Activity

***Activity*** is any movement produced by muscles that uses energy. It includes all forms of active play, sport, dance and exercise as well as active transportation and routine, habitual activities.

3. Does your school or department monitor pupils' activity in anyway within the curriculum? YES NO

If NO, please go straight to question 2.

If YES,

- (a) Why is pupil's activity monitored?

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- (b) How is the information collected utilised?

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- (c) In what area(s) of the curriculum is pupils' activity monitored?

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- (d) In which of the following ways is pupils' activity monitored?

(please tick all boxes that apply)

Questionnaire

Activity diaries

Registers

Observation

Pedometer (movement/ step counter)

Accelerometer

Heart rate monitoring

Other (please specify below)

(e) How often is pupils' activity monitored?

Occasionally (e.g. once during a key stage)

Once a year

Two or more times per year

(f) When is pupils' activity typically monitored?

Beginning of year

Middle of year

End of year

Various times of the year

**(The next question only applies if your school or department does not currently monitor pupils' activity)**

2. Do you think your school or department should monitor pupils' activity?

YES

NO

Please give reasons for your answer

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Section E

Monitoring Young People's Fitness

***Fitness* is a set of attributes that individuals have or achieve that enables them to participate in and benefit from activity.**

1. Does your school or department monitor pupils' fitness in anyway within the curriculum? YES NO

If NO, please go straight to question 2.

If YES,

- (a) Why is pupils' fitness monitored?

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- (b) How is the information collected utilised?

---

---

- (c) In what area(s) of the curriculum is pupils' fitness monitored?

---

---

- (d) Which of the follow components of physical fitness are monitored?

(please tick all boxes that apply)

Aerobic capacity/cardiorespiratory endurance/stamina

Muscular strength/endurance

Flexibility

Body composition

Power

Agility

Balance

Speed

Coordination

Reaction time

Other (please specify below)

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---

(f) Which of the following methods or tests are used to monitor pupils' fitness? (please tick all boxes that apply)

- Step test
- Time/distance run
- Multi-Stage Fitness Test ('bleep' test)
- Shuttle run
- Cycle ergometer test
- Treadmill test
- Sit and reach flexibility test
- Shoulder flexibility test
- Back flexibility test
- Sit-ups/curl-ups
- Pull-ups
- Push-ups
- Flexed arm hang
- Handgrip dynamometer
- Skinfold measurements
- WHR (waist-to-hip ratio)
- BMI (body mass index)
- Other (please specify below)

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(g) How often is pupils' fitness monitored?

- Occasionally (e.g. once during a key stage)
- Once a year
- Two or more times per year

(h) When is pupils' fitness typically monitored?

- Beginning of year
- Middle of year
- End of year
- Various times of the year

(The next question only applies if your school or department does not currently monitor pupils' fitness)

4. Do you think your school or department should monitor pupils' fitness? Please give reasons for your answer
- YES NO
- 

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**Section E**

**Monitoring Health, Activity and Fitness within the School Curriculum**

2. Is health, activity and/or fitness monitoring a compulsory component of the PE curriculum for any of the following year groups? (please tick all boxes that apply)

	Health	Activity	Fitness
Year 7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Year 8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Year 9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Year 10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Year 11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Year 12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Year 13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If NO, do you feel health, activity and/or fitness monitoring should be a compulsory component of the PE curriculum for any year groups?

Please give reasons for your answer

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(Questions 2-4 only apply if your school or department currently monitors young people's health, activity or fitness. If your school or department does not currently monitor young people's health, activity or fitness please go straight to Question 5)

2. If your school or department monitors pupils' health, activity **and** fitness, which, if any, is given most emphasis?

- Health
- Activity
- Fitness
- All given equal emphasis

Please provide reasons

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If your school or department monitors only 1 or 2 of the above, please explain why this is.

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3. Generally how do your pupils respond to health, activity and/or fitness monitoring within the curriculum? (If your school is mixed sex school, you can either answer the question separately between boys and girls or mixed).

		Respond Positively	Respond Negatively	Neutral Response	Not Applicable
Health	Mixed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Boys	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Girls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Activity	Mixed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Boys	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Girls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fitness	Mixed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Boys	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Girls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



4. Is any of the health, activity or fitness information reported to parents either verbally or in a written report? (Please tick all boxes that apply)

- |                      |                          |
|----------------------|--------------------------|
| Health information   | <input type="checkbox"/> |
| Activity information | <input type="checkbox"/> |
| Fitness information  | <input type="checkbox"/> |

5. Please comment on the extent to which you agree/disagree with the following statements.

	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
(a) Monitoring young people's health should be an important component of any PE programme.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(b) Monitoring young people's activity is a waste of time.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(c) More emphasis should be placed on monitoring young people's fitness within the PE curriculum.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(d) It is desirable to monitor young people's health within the school curriculum.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(e) Monitoring young people's activity is problematic within the school curriculum.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(f) Too much time is spent on monitoring young people's fitness within the school curriculum.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(g) Fitness testing merely distinguishes the mature and motivated pupils from the less mature and de-motivated.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(h) Schools have a responsibility to monitor pupils' health, activity and fitness.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(i) The way in which monitoring is carried out influences young people's attitudes towards their health, activity and fitness.

(j) Fitness testing can be effective in promoting activity and fitness.

(k) Promoting and monitoring activity is more important than promoting and monitoring fitness within the curriculum.

(l) It is more appropriate to monitor health-related fitness than skill-related fitness.

6. Do staff use any texts to assist in monitoring health, physical activity and fitness?

If yes, please provide brief details of the texts.

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7. The following questions apply to yourself, as Head of Physical Education:

(a) Are you male or female? (please tick the appropriate box) Male  Female

(b) How many years experience do you have of teaching Physical Education?

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(c) How many years experience do you have as a Head of Physical Education?

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FINALLY, THANK YOU VERY MUCH FOR SPENDING  
VALUABLE TIME COMPLETING THE QUESTIONNAIRE.

Please return the completed questionnaire in the  
self-addressed stamped envelope provided to:

Ming-Hung Chen  
School of Sport and Exercise Sciences  
Loughborough University  
LE11 3TU

By

**Friday 13<sup>th</sup> February 2004.**

## Appendix C: Interview Questions

Questions for HoPEs who monitor Health, Activity and Fitness

1. Why do you think it is desirable to monitor young people's (1) health, (2) activity and (3) fitness within the school curriculum?
2. What sort of information do you obtain about young people's (1) health, (2) activity and (3) fitness? How do you use this information? (ask this for each of health, activity and fitness)
3. Do you think that some of this information is more important than others? Please tell me your reasons for thinking this.
4. Does monitoring young people's (1) health, (2) activity and (3) fitness create any particular issues for you and your department? Do you have any views about the effects of monitoring on young people?
5. How do your pupils respond to the monitoring? Are some monitoring procedures more popular than others? Are some pupils affected more than others pupils?
6. Do you think that there should be more emphasis in schools on monitoring young people's health, activity and fitness within the curriculum? Can you explain your reasons?
7. Do you think that schools have a responsibility to monitor pupils' health, activity and fitness? Why do you think this is?
8. Do you feel that young people's attitudes towards their health, activity and fitness are influenced through monitoring? If so, in what way?
9. What do you think pupils learn when they monitor their health, activity and fitness? Which parts of the National Curriculum are being addressed when you involve pupils in monitoring their health, activity and fitness?
10. Do you use any particular texts or resources to assist in monitoring health, physical activity and fitness? If yes, please can you tell me which ones? How useful have you found this?
11. Have you received any in-service training (INSET) or continuing professional development (CPD) about monitoring children's health, activity and fitness? How beneficial was this to you?
12. Do you think that teachers need more support to help them to decide whether and how to monitor pupils' health, activity and fitness?

## Questions for HoPEs who monitor Fitness

1. Why do you think it is desirable to monitor young people's fitness within the school curriculum?
2. What sort of information do you obtain about young people's fitness?  
How do use this information?
3. Do you think that this information is more important than others? Please tell me your reasons for thinking this.
4. Does monitoring young people's fitness create any particular issues for you and your department? Do you have any view about the effects of monitoring On young people?
5. How do your pupils respond to the monitoring? Are some monitoring procedures more popular that other? Are some pupils affected more than others pupils?
6. Do you feel that young people's attitudes toward their fitness are influenced through monitoring? If so, in what way?
7. What do you think pupils learn when they monitor their fitness? Which parts of the National Curriculum are being addressed when you involve pupils in monitoring their fitness?
8. Do you use any particular texts or resources to assist in monitoring fitness? If yes, please can you tell me which ones? How useful have you found this?
9. Have you received any in-service training (INSET) or continuing professional development (CPD) about monitoring children's health, activity and fitness? How beneficial was this to you?
10. Do you think schools have a responsibility to monitor pupils' (1) health, (2) activity and (3) fitness? Why do you think this is?
11. Do you think that more emphasis should be placed on monitoring health or activity? Can you explain your reasons?
12. Do you think it desirable to monitor young people's health and activity within the school curriculum? Can you explain your reasons?
13. Do you think that teachers need more support to help them to decide whether and how to monitor pupils' health, activity and fitness?

Questions for HoPEs who did not monitor health, activity and fitness

1. Do you think it is desirable to monitor young people's (1) health, (2) activity and (3) fitness within the school curriculum?
2. Does monitoring young people's (1) health, (2) activity and (3) fitness create any particular issues for you and your department? Do you have any views about the effects of monitoring on young people?
3. Do you think schools have a responsibility to monitor pupils' (1) health, (2) activity and (3) fitness? Why do you think this is?
4. Do you think the monitoring information is important and could be used for?
5. Do you feel that young people's attitudes towards their health, activity and fitness are influenced through monitoring? If so, in what way?
6. Do you think pupils will learn when they monitor their health, activity and fitness? If you can, which parts of the National Curriculum you can address when you involve pupils in monitoring?
7. Have you received any in-service training (INSET) or continuing professional development (CPD) about monitoring children's health, activity and fitness? How beneficial was this to you?
8. Do you think that teachers need more support to help them to decide whether and how to monitor pupils' health, activity and fitness?

## *Appendix D: Letter to Schools*

Ming-Hung Chen  
Postgraduate Research Student  
School of Sport and Exercise Sciences  
Loughborough University, LE11 3TU  
Tel: 01509 228451  
[M.Chen@lboro.ac.uk](mailto:M.Chen@lboro.ac.uk)

Dear Head of Physical Education,

1<sup>st</sup> December 2003

I am a postgraduate research student in the School of Sport and Exercise Sciences at Loughborough University and am conducting a study on 'Health, Fitness and Activity Monitoring' supervised by Dr Jo Harris and Dr Lorraine Cale. I am writing to you in the hope that you will agree to assist me in my study by completing the enclosed questionnaire.

I realise the demands on your time and know that you are very busy but your involvement in this research project would be greatly appreciated. The questionnaire is reasonably straightforward and mostly requires responses involving circling or ticking appropriate numbers and boxes.

Please be assured that any information you provide will be treated in strict confidence. The findings will not be presented in any way that will identify you, your department or school. A summary of the results of the study will be made available to you on request. It would be most helpful if you could complete and return the questionnaire to me by **Thursday 18<sup>th</sup> December 2003** in the stamped addressed envelope provided.

In the meantime, if you have any questions concerning the study, please feel free to contact me or my supervisors Dr Jo Harris (01509 223250; [J.P.Harris@lboro.ac.uk](mailto:J.P.Harris@lboro.ac.uk)) or Dr Lorraine Cale (01509 228454; [L.A.Cale@lboro.ac.uk](mailto:L.A.Cale@lboro.ac.uk)). I thank you in anticipation of your co-operation.

Yours sincerely,

Ming-Hung Chen  
Postgraduate Research Student, Loughborough University

Ming-Hung Chen  
Postgraduate Research Student  
School of Sport and Exercise Sciences  
Loughborough University, LE11 3TU  
Tel: 01509 228451  
[M.Chen@lboro.ac.uk](mailto:M.Chen@lboro.ac.uk)

Dear Head of Physical Education,  
2<sup>nd</sup> January 2004

If you recall, I sent a questionnaire to you towards the begin of December 2003 on 'Health, Fitness and Activity Monitoring in Secondary School.' This questionnaire forms the basis of some research I am currently undertaking, supervised by Dr Jo Harris and Dr Lorraine Cale.

As I have not yet received the completed questionnaire form you, and the return date has now passed, I am writing once again in the hope that you may be able to find time to complete the questionnaire and return it to me in the self-address posted envelope.

I appreciate that you are very busy and I hope that you feel able to assist in my research. The questionnaire is fairly straightforward and mostly requires simple responses involving circling or ticking appropriate boxes. Please be reminded that any information you provide will be treated in strict confidence and that **the findings will not be presented in any way that will identify you, your department or school.** A summary of the results of the study will be made available to you on request.

I thank you in anticipation of your co-operation and I look forward to hearing from you soon. It would be most helpful if you could complete and return the questionnaire to me by **Friday 13<sup>th</sup> January 2004** in the stamped addressed envelope provided.

In the meantime, if you have any questions concerning the study, please feel free to contact me or my supervisors Dr Jo Harris (01509 223250; [J.P.Harris@lboro.ac.uk](mailto:J.P.Harris@lboro.ac.uk)) or Dr Lorraine Cale (01509 228454; [L.A.Cale@lboro.ac.uk](mailto:L.A.Cale@lboro.ac.uk)).

Yours sincerely.

Ming-Hung Chen  
Postgraduate Research Student, Loughborough University



Ming-Hung Chen  
Postgraduate Research Student  
School of Sport and Exercise Sciences  
Loughborough University, LE11 3TU  
Tel: 01509 228451  
[M.Chen@lboro.ac.uk](mailto:M.Chen@lboro.ac.uk)

Dear Head of Physical Education,

26<sup>th</sup> January 2004

I am a postgraduate research student in the School of Sport and Exercise Sciences at Loughborough University and am conducting a study on "Health, Fitness and Activity Monitoring in Secondary Schools" supervised by Dr Jo Harris and Dr Lorraine Cale. I am writing to you in the hope that you will agree to assist me in my study by completing the enclosed questionnaire.

I realise the demands on your time and that you are very busy but your involvement in this research project would be greatly appreciated. The questionnaire is reasonably straightforward and mostly requires responses involving ticking appropriate boxes.

Please be assured that any information you provide will be treated in strict confidence. The findings will not be presented in any way that will identify you, your department or school. A summary of the results of the study will be made available to you on request. It would be most helpful if you could complete and return the questionnaire to me by **Friday 13<sup>th</sup> February 2003** in the stamped addressed envelope provided.

In the meantime, if you have any questions concerning the study, please feel free to contact me or my supervisors Dr Jo Harris (01509 223250; [J.P.Harris@lboro.ac.uk](mailto:J.P.Harris@lboro.ac.uk)) or Dr Lorraine Cale (01509 228454; [L.A.Cale@lboro.ac.uk](mailto:L.A.Cale@lboro.ac.uk)). I thank you in anticipation of your co-operation.

Yours sincerely.

Ming-Hung Chen

Ming-Hung Chen

Postgraduate Research Student, School of Sport and Exercise Sciences

Loughborough University, LE11 3TU

Tel: 01509 228451

Dear Head of Physical Education,

16<sup>th</sup> February 2004

If you recall, I sent a questionnaire to you towards the begin of February 2004 on 'Health, Fitness and Activity Monitoring in Secondary School.' This questionnaire forms the basis of some research I am currently undertaking, supervised by Dr Jo Harris and Dr Lorraine Cale.

As I have not yet received the completed questionnaire form you, and the return date has now passed, I am writing once again in the hope that you may be able to find time to complete the questionnaire and return it to me in the self-address posted envelope.

I appreciate that you are very busy and I hope that you feel able to assist in my research. The questionnaire is fairly straightforward and mostly requires simple responses involving circling or ticking appropriate boxes. Please be reminded that any information you provide will be treated in strict confidence and that **the findings will not be presented in any way that will identify you, your department or school.** A summary of the results of the study will be made available to you on request.

I thank you in anticipation of your co-operation and I look forward to hearing from you soon. It would be most helpful if you could complete and return the questionnaire to me by **Friday 27<sup>th</sup> February 2004** in the stamped addressed envelope provided.

In the meantime, if you have any questions concerning the study, please feel free to contact me or my supervisors Dr Jo Harris (01509 223250; [J.P.Harris@lboro.ac.uk](mailto:J.P.Harris@lboro.ac.uk)) or Dr Lorraine Cale (01509 228454; [L.A.Cale@lboro.ac.uk](mailto:L.A.Cale@lboro.ac.uk)).

Yours sincerely,

Ming-Hung Chen

Postgraduate Research Student, Loughborough University

Ming-Hung Chen  
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Dear Headteacher,

15<sup>th</sup> March 2004

I am involved in ongoing research focusing on "Health, Fitness and Activity Monitoring in Secondary Schools" supervised by Dr Jo Harris and Dr Lorraine Cale. To date, the research has involved a national survey, to which your Head of Physical Education kindly contributed by completing a questionnaire. The next phase of the research involves pursuing issues arising from the survey through interviews with Head of PE Department (HoPED) in a number of schools. Direct discussions with HoPED are considered essential in order to gain a thorough and accurate understanding of issues associated with health, fitness and activity monitoring in secondary schools.

I am writing to you in the hope that you will agree for your HoPED to be amongst those interviewed. Obviously any interview would be subject to the agreement of the individual concerned and would be arranged at a time to suit him/her. I can assure you that the information provided will be treated as confidential and that schools and individuals will not be named in any written report.

If you are willing for your school to be involved, I would be grateful if you would please pass the enclosed letter to your HoPED . If you are not happy for your school to be involved, please return this communication in the enclosed stamped addressed envelope. I look forward to hearing from your school in due course.

Thank you in anticipation of your co-operation.

Yours sincerely,

Ming-Hung Chen  
Postgraduate Research Student, Loughborough University

Ming-Hung Chen  
Postgraduate Research Student  
School of Sport and Exercise Sciences  
Loughborough University, LE11 3TU  
Tel: 01509 228451  
[M.Chen@lboro.ac.uk](mailto:M.Chen@lboro.ac.uk)

Dear Head of Physical Education,

15<sup>th</sup> March 2004

I am involved in ongoing research focusing on "Health, Fitness and Activity Monitoring in Secondary Schools" supervised by Dr Jo Harris and Dr Lorraine Cale. To date, the research has involved a national survey, to which you kindly contributed by completing a questionnaire. The next phase of the research involves pursuing issues arising from the survey through interviews with PE Head of Department (HOD) in a number of schools. Direct discussions with HOD are considered essential in order to gain a thorough and accurate understanding of issues associate with the health, fitness and activity monitoring in secondary schools.

I am writing to you in the hope that you will agree to be amongst those interviewed. The interview would last no more than an hour and could be conducted at your school at a time to suit you. I can assure you that the information provided will be treated as confidential and that schools and individuals will not be named in any written report.

I will be conducting the interviews after Easter, between April-May 2004. If you are willing to be interviewed, please consider the enclosed schedule, which outlines my whereabouts during the time, and use this to suggest some possible dates and times when you would be available for interview. If you would like to know more about the research, please do not hesitate to contact me. If you are willing to be involved, could you please complete the reply slip and return it in the stamped addressed envelope provided by **2<sup>nd</sup> April 2004**. I look forward to hearing from you.

Thank you in anticipation of your co-operation.

Yours sincerely,

Ming-Hung Chen  
Postgraduate Research Student, Loughborough University

## Appendix E: Interview Timetable

### The Interview Timetable

School	Area	Date	
	<b>London and South West</b>	<b>26<sup>th</sup>, 27<sup>th</sup>, 28<sup>th</sup> April, 2004</b>	
A	M087 (3.5years)	Hampshire	27 <sup>th</sup> 12:00
B	M274 (28 years)	Trowbridge, Wiltshire	28 <sup>th</sup> 9:00
C	M047 (34 years)	Camelford, Cornwall	28 <sup>th</sup> 2:30
	<b>South East England</b>	<b>29<sup>th</sup>, 30<sup>th</sup> April, 2004</b>	
D	278 (4years)	Maidenhead, Berkshire	29 <sup>th</sup> 10:10
E	074 (12 years)	Peacehaven, East Sussex	29 <sup>th</sup> 3:00
	<b>Midlands</b>	<b>3<sup>rd</sup>, 4<sup>th</sup>, 7<sup>th</sup> May, 2004</b>	
F	M179 (18 years)	Peterborough	4 <sup>th</sup> 10:30
G	M132 (13 years)	Coalville, Leicestershire	4 <sup>th</sup> 14:00
	<b>North West England</b>	<b>10<sup>th</sup>, 11<sup>th</sup> May, 2004</b>	
H	M245 (17 years)	Ashton-under-Lyne, Lancashire	10 <sup>th</sup> 8:30
I	246 (15 years)	Hattersley, Hyde, Cheshire	10 <sup>th</sup> 11:00
J	M022 (29 years)	Bradford	10 <sup>th</sup> 13:10
K	M203 (23 years)	Liverpool	11 <sup>th</sup> 14:30
	<b>North East England</b>	<b>12<sup>th</sup>, 13<sup>th</sup> May, 2004</b>	
L	M119 (20years)	Shelley, Huddersfield	12 <sup>th</sup> 15:15

