
Title	Teaching Vaulting to Upper Primary Pupils.
Author(s)	Michael Koh & Anwari Khairuddin
Source	<i>Teaching and Learning</i> , 23(2), 179-187
Published by	Institute of Education (Singapore)

This document may be used for private study or research purpose only. This document or any part of it may not be duplicated and/or distributed without permission of the copyright owner.

The Singapore Copyright Act applies to the use of this document.

Teaching Vaulting to Upper Primary Pupils

Michael Koh & Anwari Khairuddin

Abstract

A review of the revised physical education syllabus published in 1999 by the Ministry of Education, for implementation in the year 2000, showed that vaulting is not part of the repertoire of experiences for the primary school pupil. Perhaps the perceived “danger” associated with the apparatus resulted in its omission. This article will consider some ways in which vaulting may be taught safely and effectively to our pupils, using an educational gymnastics approach. An overview of the vaulting action is provided so as to help the reader understand its movement requirements. In addition, a rationale for teaching the vault is given from the perspective of growth and motor development.

Introduction

The Curriculum Planning and Development Division (CPDD) of the Ministry of Education in Singapore, revised the physical education (PE) syllabus in 1999 for its implementation in the year 2000. It is not the first time gymnastics has been included as part of PE. However, a review of the syllabus will show that vaulting is not part of the repertoire of experiences for the primary school pupil. Perhaps it is the “danger” associated with the apparatus that resulted in its omission. This article will consider some ways in which vaulting may be taught safely and effectively, to pupils in the upper primary level, using an educational gymnastics approach. In particular, it will suggest ways to overcome the fear of vaulting by addressing the “approach and takeoff phases” of vaulting which are the limiting factors of successful outcomes on the vault.

One of the features of educational gymnastics is in the variety of teaching methods that may be utilised. However, many PE teachers frequently use the command style when teaching gymnastics due to its high degree of efficiency, conformity and uniformity. It is very effective when the objective is to teach a specific and challenging technique in a safe manner, such as the takeoff in vaulting. However, while such a teacher-centred approach may achieve very much in terms of skill acquisition, discipline and obedience, it would be less likely to produce the “thinking” pupil or one who is willing to make decisions. Given the current

educational emphasis on creativity and thinking, the command style of teaching cannot be the single teaching method, even for gymnastics vaulting, in a system that seeks to promote other aspects of development apart from the physical. The practitioner is reminded here that skills taught in educational gymnastics are not as an end in themselves but are also for adaptation purposes, in which the pupils begin to adapt the skills to a variety of situations. Williams (1987) suggested that the utilisation of skills be fostered in two ways: i) by the teaching styles; for instance, divergent, reciprocal, or the practice style which in turn affect the potential of an activity; and ii) by the careful structuring of tasks that requires pupils to assess the task in movement terms; selecting the movement appropriate to the nature of the task and personal bodily competence; and performing the task with maximum economy of effort through practice.

Is the Fear of Vaulting a Valid One?

To answer this question, it would be helpful to look at the history and evolution of gymnastics vaulting. Vaulting takes its inspiration from man's natural instinct to leap over obstacles. It has been performed over many centuries as a way of getting from point A to B or as a test of courage. The long horse originated during the time of the Roman Empire and was used to teach new soldiers how to ride horseback on wooden dummy horses (Goodbody, 1982). Later, in the Middle Ages, vaulting was a practice of horsemanship (Aykroyd, 1985). Current vaulting movements expanded from this original idea of getting off the horse safely. For a time, vaulting was performed with pommels on the horse and the gymnast was required to arrive in a handstand, to balance for a fraction of a second, before over-swinging or squatting through the hands to dismount (Warren, 1980). As it developed further, more emphasis was placed on long flights prior to horse contact (preflight), followed by a "dropping off" from the horse. The introduction of the springy takeoff board at the 1956 Olympic Games in Melbourne, Australia, facilitated the development of vaults such as the handspring (Takei, 1989). The revelation of new vaults by Yamashita and Tsukahara in the 1962 and 1970 World Championships respectively, changed the development of vaulting further (Smither, 1980). The vaults that they introduced were characterised by very high approach speeds, a shorter preflight and a higher flight after horse contact. Given this historical background, it is not surprising that a typical lesson on gymnastics vaulting will require pupils to leap over an obstacle such as a horse or a box. The element of courage is tested indeed. Added to this, is the perception among pupils that vaulting means difficult skills such as handsprings, headsprings and necksprings, and other forms of competitive gymnastic vaults. Thus, it is not surprising that the activity induces fear in pupils and anxiety in the PE teacher. This fear of vaulting needs to be overcome.

Growth and Motor Development Perspectives

Traditionally, specialists in the area of motor development often cite natural progression and automation as the means by which a child develops better coordination. Recently, motor theorists have reiterated that environmental exposure and circumstances could also be factors in accelerating the motor development of young children (Thelen, 1995). Essentially, the more types of movement children experience at an early age, the better and more coordinated they would become as they mature. Good coordination is not simply inborn but develops with the appropriate maturation of the central nervous system and experience from exposure to activities (*ibid*). Novel movements should be learned with correct repetitions and informative feedback that will eventually improve the coordination of the children as the movements become habitual and automatic (Schmidt, 1991). Therefore, from a motor development perspective, vaulting as an activity is novel and adds to the movement repertoire of children. Through regular practice within the gymnastics programme of a school, children can benefit from improved motor coordination.

From a growth and development perspective, irrespective of age or sex, regular sport and physical activity provides an appropriate weight bearing stimulus for the skeleton. This is important for normal skeletal health. Consistent use of these skeletal muscles provides stress and strain that is necessary for normal bone growth and development. Physical inactivity has long been known to cause loss of bone mineral and decrease in muscle size (Bar-Or, 1989). Research has shown that weight bearing exercises have a positive effect in preventing demineralisation of the bones (Hills, 1991). Vaulting encompasses all the elements of a weight bearing activity; namely, running, hopping, jumping and landing. It is a suitable activity to promote skeletal health in young children.

However, the cartilaginous components of the growing skeleton of the child represent a weak link in the skeletal framework and must not be overstressed. There is a need for proper care and supervision of the gymnastics activities undertaken. It is the PE teacher's responsibility to moderate the intensity and duration of gymnastics activities within the PE programme. Safety in gymnastics, as with all physical activities, is of paramount importance. Emphasising safe practices like correct landing techniques and using appropriate safety mattresses to absorb the impact of landing will not only help to prevent injuries, but also provide the psychological boost to the readiness of the children for participation. A final reminder to the practitioner is that children should never be treated as simplified versions of adults. It is important that young children are not required to emulate the standard of performance of competitive gymnasts. Therefore, the educational approach to teaching vaulting will serve the practitioner well in fulfilling the broader aims of PE through gymnastics. An awareness of the growth and developmental stages of children will thus enable PE teachers to select appropriate

activities, that are progressively challenging and developmentally beneficial, to incorporate into their gymnastic lessons.

The Phases of Vaulting

At this juncture, the authors deem it pertinent to remind practitioners of the characteristics essential for a successful outcome on the vault, prior to outlining some strategies for teaching vaulting. All vaults comprise the following phases: the approach (run-up and hurdle-step); board takeoff; preflight (flight phase before contact with the vault); impact (between the hands and the vault); postflight (flight phase after impact); and landing (Low, 1990).

In the run-up, the objective is to attain an appropriate approach speed necessary for the vault and be able to land onto the springboard accurately. Speed and accuracy are the key elements of the run-up. The hurdle-step is a transitional phase between the run-up and the springboard takeoff. It involves the performer taking off on one leg, to land onto the springboard with both feet. The objective in the hurdle step is to enable the performer to make efficient use of the springboard, without losing the approach momentum. The flight path is usually low for this phase of the vault.

The purpose of the board takeoff is to obtain sufficient rotational and linear momentum for the vault being performed. Bruggemann (1994) suggested that this phase was the most significant aspect of the vault because the preflight conditions are determined in this phase. It takes practice to be able to takeoff at the precise moment, when the body is in an appropriate position relative to the springboard. Often, the causes of negative vault outcomes may be attributed to these early phases (run-up, hurdle step and springboard takeoff). Researchers (Dainis, 1981; Bruggeman, 1994) have shown that a large approach speed and efficient takeoff techniques from the springboard are among the important determinants for successful vaulting. Cao (1996) reported that the good takeoff techniques of advanced gymnasts resulted in markedly higher horizontal, vertical and angular velocities at board takeoff than the beginners. Although the PE teacher does not aim to produce elite gymnasts, nevertheless, the importance of a correct takeoff together with an appropriate approach speed cannot be dismissed. PE teachers need to know that these factors are essential to successful vaulting. All too often, pupils stumble over the box or horse and remain frightened of it. Thus, the PE teacher should aim to teach the competent use of flight assisting apparatus (springboard and trampette).

Preflight is the phase between spring board takeoff and horse contact. Since the amount of rotation and the flight path of the body during the preflight are both established at the springboard takeoff, the PE teacher must state clearly the aim of the vaulting practice. If the aim is to explore various ways of getting around the box or horse, it is not necessary to have a high preflight. King *et al.*

(1999) showed that a low preflight is desirable where the vault does not involve somersaulting rotations (e.g. straddle vault). On the other hand, vaults of a somersaulting nature (e.g. handspring vault) require a higher preflight (Koh *et al.*, 2001). These vaults are characterised by the performer propelling the body upward to contact the horse at a steep angle before continuing with the somersault rotation. Therefore, in terms of difficulty, it makes good sense to teach vaulting using movement repertoires that does not involve somersaulting. There is much scope for using an educational gymnastics approach here, through exploration.

During the impact phase, the aim is to generate 'lift' for the postflight by pushing off with the hands strongly against the horse. Here, the primary concern for the practitioner should be in the ability of the pupil to push herself or himself off the horse or box, or even support the body weight for the brief period on the box or horse while the rest of the body comes around it. A good push off the horse with the hands should enable the child not to trip over the box or horse. This is a sufficient yardstick to measure success. In the educational gymnastics approach, the pupil is encouraged to come up with ways to get over or around the horse without tripping over it.

During postflight, the performer should focus on completing the desired movement and to prepare for landing. Nothing can be done to alter the flight path of the body once airborne. The physical characteristics of motion are established at the board takeoff phase and subsequently modified at the hand impact phase. It is therefore prescient to stress the importance of these earlier vault phases.

Landing is the final phase where the performer comes to a stationary position by absorbing the forward and downward momentum of the postflight. For a vault to be successful, it is imperative that the performer lands on the feet first and if possible to "stick" the landing. Sticking the landing refers to the action of cushioning the landing, by bending at the knees and hips, so that any additional forward movement is curtailed. This is a helpful movement to prevent accidents such as twisting the ankle, crashing into another obstacle ahead, or falling.

Providing a Positive Experience

Although the vaulting movement is dynamic in nature and involves all six phases at every performance, it is possible to teach vaulting in stages using an educational gymnastics approach. Below are some suggestions to teach these stages in a safe and confidence inspiring way.

- **Teach proper landing.** Since what goes up must come down. It would be prudent to teach proper landing first. Pupils learn to "stick" their landing by bending at the knees and hip. This may be done by jumping off boxes, benches or jumping on the spot and subsequently from a very short run-up. Using a

theme of flight, have pupils run into a leap or a jump from one foot to land with both feet, onto safety mats. Encourage “stillness” upon landing. Ensure that the mats are on non-slip surfaces. Using the guided discovery teaching style, lead the pupils to understand what they must do at the knees, hips and ankle to cushion the impact of the fall. For example,

“What knee action will help you to land without experiencing a big shock to the body?”

“Does bending at the hips also help to cushion the landing?”

“Which part of the foot do you land on first?”

Emphasize to pupils that the aim of landing is to minimise the shock by prolonging the time of landing with the appropriate body actions.

- ***Teach efficient use of body parts to gain height in flight.*** Pupils learn to make use of arm swing, knee and ankle extensions to gain height in flight. Within the theme of flight, use guided discovery to help pupils realise that they can use their legs and arms to propel themselves higher. Through practice situations, help them realise that arm swings should be timed correctly, and the arms are swung upward and forward. For example,

“What happens when you swing your arms upwards as you jump up?”

“Try swinging your arms sideways as you jump. Does that help you get higher?”

Next, lead them to discover that apparatus can assist them to gain height in jumps. Repeat the exploratory work but using bench tops and benches as flight assisting equipment. Use the divergent teaching style to explore shapes in flight, while maintaining focus on safety through good landing techniques.

- ***Teach efficient use of the springboard or trampette.*** Use a platform such as a bench or one comprising a two- or three-segment box. Pupils step off the platform with a backward swing of the arms onto the springboard or trampette. Encourage knee extension and upward arm swing for propulsion. Practise to improve the coordination between leg extension and arm swing. The divergent teaching style may also be used here to explore various shapes in the air, both symmetrical and asymmetrical. The aim here is two fold: first, to allow for practice as they strive for mastery of the use of the equipment; and second, utilisation of the skills learnt previously within the context of increased flight time. Encourage them to “stick” the landing for the sake of safety.
- ***Teach the hurdle step.*** The hurdle step is a one-foot takeoff to two-feet landing onto the springboard or trampette. The practice is to enable pupils to run into a low hop for takeoff from the equipment. The low hop will facilitate the transfer of the approach momentum. Initially, line up 3 hoops, along the floor as

landing targets. Pupils practise hopping off the first hoop to land on two feet in the next hoop or the furthest one. Encourage pupils to keep the hands behind as they hop off. Subsequently, extend this practice by setting a task requiring an immediate takeoff from the two-feet landing. Emphasize the use of arm swings. Coordinating the arm swing from the start of the hurdle step to takeoff will be the single biggest challenge for the teacher. As the practice progresses, guide pupils to realise that they could increase the hopping distance if they approach with a run. Start with a short run up of three strides. Next, replace the last hoop with a box top, springboard or trampette and continue the practice from a short run-up of three strides. Work on the coordination between the arms and legs, namely, to keep the arms back during the hop and to swing them forward and upward during takeoff. Subsequently, pupils may be encouraged to form sequences involving flight and balance. E.g. Form a shape in the air from a three-stride run, finish in a balance.

- ***Teach a fast and controlled approach run.*** How fast should one run? Since the aim is to provide a successful experience for the child, the speed should therefore be manageable for the pupil; yet sufficient to facilitate his or her vaulting action. It therefore varies for each child. For this practice, keep the run-up length to 5 or 7 strides. Encourage pupils to run fast with consistent technique, that is, without shuffling the feet when approaching the springboard. The objective is to land on the springboard accurately and consistently. One of the key ingredients to consistency in the run up is to have good visual cues. This is often neglected by PE teachers. Correct practices will facilitate the habituation and automation of movement patterns. Have pupils work in groups to determine for themselves where each member should begin the run-up and the hurdle step. To determine the approach run length, first run into a hurdle step away from the springboard. Have a group mate make a checkmark on where the hurdle step landed. This checkmark becomes the starting point of the run-up. Repeat again for accuracy. Having determined the starting point of the run, pupils then practise the approach run and hurdle step toward the spring board repeatedly to improve the consistency. The marker should draw a line on the floor where the hurdle step occurred. This line serves as an important visual cue to the pupil in attaining a consistent approach. Guide pupils to realise that as they vary the speed of approach, then the start of the hurdle step will vary with that speed and so it is important to run consistently at a manageable speed. Help them to see that the faster they run, the more momentum they have but there is also a greater risk of missing the springboard and experiencing a bad landing. The important lesson here is to run fast with control so that the takeoff is accurate. Encourage them to "stick" the landing for the sake of safety. The opportunities for three teaching styles avail themselves here. Group work provides the opportunity for reciprocal teaching where pupils give feedback on the approach run; there is also the practice

style in effect and finally the teacher may use teaching with limitation to set sequencing tasks, to add variety to the practices.

- *Explore ways of going onto, off, over and around the horse/box top.* Use the divergent style to first explore a variety of ways to get onto and off the horse or box top, over or around it. There is no need to use a flight assisting apparatus for this activity initially. The teaching through limitation style may subsequently be used to encourage pupils to form sequences involving getting onto, off, over or around the box or horse. For example, take weight on hands to get around the horse, finish with a quarter turn before landing. As the practice progresses, introduce a spring board to repeat the exploration but without an approach run. Have pupils practise on one or two ways to get around the horse. Finally, the teacher may introduce the task with an approach run, initially with three strides before progressing further.

Conclusion

An educational gymnastics approach to the teaching of vaulting has been advocated in this paper. Such an approach allows the practitioner to veer away from the traditional forms of vaulting and provide every child the experience to broaden their movement “vocabulary”. There is flexibility for the practitioner to teach the various stages in any order. For instance, if the teacher prefers to introduce the box top or horse, this may be done without the introduction of the spring board and approach run. However, it is prudent to teach pupils to land properly first (for safety’s sake) before teaching the takeoff phase and also to teach efficient use of any flight assisting equipment before embarking on a faster approach run.

It is hoped that the PE teacher will be encouraged to embark on this challenging task of equipping our pupils with the confidence and courage to vault successfully. Such positive experiences will improve motor coordination and promote self-confidence in our pupils. Furthermore, the boys will be equipped with a set of skills that will be useful for National Service where there are walls to scale and scaffolding to clear.

Dr. Michael Koh is an Assistant Professor in the Physical Education & Sports Science Academic Group at the National Institute of Education, Singapore. He lectures in Biomechanics and Gymnastics.

Mr. Anwari Khairuddin is a Teaching Fellow in the Physical Education & Sports Science Academic Group at the National Institute of Education, Singapore. He lectures in the area of Motor Development and Gymnastics.

References

- Aykroyd, P. (1985). *Modern gymnastics*. London: Marshall Cavendish.
- Bar-Or, O. (1989). Trainability of the pre-pubescent child. *Physician and Sports Medicine*, 17, 65–66.
- Bruggemann, G. P. (1994). Biomechanics of gymnastics techniques. *Sport Science Review*, 3, 79–120.
- Cao, T. Y. (1996). *A three dimensional analysis of hurdle and board takeoff techniques in gymnastic vaulting*. [CD-ROM]. Abstract from: ProQuest File: Dissertation Abstracts Item: 9704968
- Curriculum Planning and Development Division (1999). *Revised Physical Education Syllabus for Primary, Secondary and Pre-University Levels*. Ministry of Education, Singapore.
- Dainis, A. (1981). A model for gymnastics vaulting. *Medicine and Science in Sports and Exercise*, 13, 34–43.
- Goodbody, J. (1982). *The illustrated history of gymnastics*. London: Stanley Paul.
- Hills, A. P. (1991). *Physical Growth and Development of Children & Adolescents*. Queensland University of Technology, School of Human Movement Studies.
- King, M., Yeadon, M. R., & Kerwin, D. G. (1999). A two-segment simulation model of long horse vaulting. *Journal of Sports Sciences*, 17, 313–324.
- Koh, M., Jennings, L., Elliott, B., & Lloyd, D. (2001). Prediction of an optimum technique for the women's yurchenko layout vault, in J. Blackwell (Ed.) *Proceedings of the XIXth International Symposium on Biomechanics in Sports*. (pp. 319–322). University of San Francisco, USA.
- Low, T. (1990). *Gymnastics: floor, vault, beam and bar*. Ramsbury, England: Crowood Press.
- Schmidt, R. A. (1991). *Motor Learning and Performance*. Champagne, IL: Human Kinetics.
- Smither, G. B. (1980). *Behind the scenes of gymnastics*. New York: Proteus.
- Takei, Y. (1989). Techniques used by elite male gymnasts performing a handspring vault at the 1987 Pan American Games. *International Journal of Sport Biomechanics*, 5, 1–25.
- Thelen, E. (1995). Motor Development: A new synthesis. *American Psychologist*, 50, 79–95.
- Warren, M. (1980). *The new book of gymnastics*. London: Arthur Barker.
- Williams, J. (1987). *Themes for Educational Gymnastics* (3rd Edn.). London: A&C Black