Age Appropriateness for the ACQUISITION OF SPECIFIC RUGBY LEAGUE SKILLS IN PRIMARY SCHOOL CHILDREN

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ABSTRACT
One of the major goals of a primary school physical education program is to teach children a range of motor skills. This is particularly true with the acquisition of fundamental movement and sport specific skills. As children develop, motor skills normally develop in a sequential and orderly manner. Therefore, physical educators need to consider the possibility that motor skills could be taught at specific ages, according to the skill's complexity and to maximise efficiency of learning. Although the game of rugby league has been modified, in order to accommodate physical development, age appropriateness for the acquisition of specific skills seems to have been neglected. This paper reports on a study to determine if there is a need for a developmentally appropriate rugby league skills program in schools. The study investigates the most appropriate age to teach the rugby league skills of : standing pass; running pass; and receiving a pass, to primary school children. Twenty four children from pre-determined age groups were randomly allocated to control and treatment groups. All students were pre and post tested, the treatment group participated in a one hour a week skills program for a duration of four weeks. Results compared improvements at each age level. Further, each individual skill is compared with relation to age, enabling the investigator to determine if age affects the learning of particular rugby league skills.

It is generally accepted that development of motor skills occurs in a orderly and sequential manner (Branta, Haubenstricker & Seefeldt 1984; Walkley, Holland, Treloar, and Probyn-Smith 1993) and in a similar way to the other parameters of the child such as intellectual capacity, physical growth and psycho/social skills (Gabbard 1992). In addition, a child's level of motor performance normally improves with age (Espenschade & Eckert 1980; Zaichkowsky, Zaichkowsky & Marteniuk 1980; Rarick 1981; Branta, Haubenstricker & Seefeldt 1984). Reports from the

literature suggest that most children have the potential to be efficient and coordinated in the fundamental motor skills by the time they are five to seven years of age (Gallahue 1989). The progressive development of motor skills has been defined and/or categorised by a number of different authors in a number of different ways over the years (Fitts and Posner 1969; Cratty 1986; Gabbard 1992; Gallahue 1993). However, the general consensus is that motor skill development occurs in sequential phases or stages.

The acknowledgment of an orderly development in relation to motor learning/development has provided physical educators with a practical guide as to when a child is ready to move from one level of a particular skill to the next (Seefeldt 1988). Although the

recognition of a sequential development of general skills exists and motor skill acquisition is a priority for physical educators (Strand & Wilson 1993), it appears to be neglected, particularly within the Australian education system (Walkley et al 1993). Further, there is no evidence to suggest at what age specific skills of individual sports need to be introduced (Seefeldt 1988). Research suggest that many schools base their physical education programs around the playing of sports and games rather than upon the teaching of motor skills, despite the clear evidence that simply playing sports and games provides insufficient opportunity for the practice of motor skills (Walkley et al 1993). Moreover, it is suggested (Walkley et al 1993) that most primary school children lack the ability to correctly perform the fundamental motor skills required for sports.

Whilst Langenford (1982) proposed that age does not effect motor performance, other authors such as Zaichkowsky, Zaichkowsky and Marteniuk (1980), Rarick (1981), Branta, Haubenstricker and Seefeldt (1984) and Gallahue (1989) state that motor performance does improve with age. Generally, the literature concludes that performance does in fact improve with age. However the explanations for this improved performance vary. Earlier studies (Corbin 1973; Rarick 1973; Malina 1975; Wickstrom 1977) argued that these changes in motor performance are most frequently attributed to physical growth, bio-mechanical and physiological factors. Logically therefore, eleven year olds should perform better than seven year olds. It is also widely excepted that variability of performance exists between individuals of the same age group. This is due in part to differential environmental stimulation during childhood years (Branta, Haubenstricker & Seefeldt 1984, p.475). The identification of this orderly sequence of motor development has provided the profession of physical education with guidelines concerning the readiness of children to move from one level of skill to another. However, Seefeldt (1988) suggested that as a profession, physical education does not yet have sufficient evidence to suggest when the introduction of specific skills should occur (Seefeldt 1988, p.49). It is this statement by Seefeldt that should

concern teachers of physical education the most.

The assessment and measurement of sporting skills has traditionally been controversial due to the subjective nature of any assessment procedure. It can be legitimately argued that the greater the controls that are placed on any skill assessment, the less realistic the skill becomes in the context of the game/sporting context. According to Branta, Haubenstricker and Seefeldt (1984), the earlier studies of motor skill development had the primarily purpose of recording the motor achievements of children in order to establish normative ages or percentiles for performance, according to chronological age. Moreover, these studies used quantitative measurements, which consisted of little concern for the proficiency with which the tasks were accomplished. However, the identification of qualitative differences in movement patterns during the 1920's has stimulated interest in motor skill progression to the present (Branta, Haubenstricker & Seefeldt 1984).

Varying formats of developmental checklists have been presented by numerous authors. Some of the more recent checklists being developed Godfrey and Kephart (1969), DeOreo (1973) and Gallahue (1982) have essentially concentrated on assessing motor skills using qualitative methods. Qualitative assessment tests (such as the test used for this investigation), measure how students' performances compare to a clearly defined set of specifications or objectives (Popham 1976). According to Holland (1986) and Kelly, Reuschlein and Haubenstricker (1990) qualitative assessment of a performance requires the motor skill to be divided into separate components. Moreover, Holland (1986) suggested

that each segment or component of a skill must be demonstrated in order for a individual to be classed as being at a mature level of performance. Information derived from qualitative assessment can provide the instructor with explicit feedback regarding the performance of motor skills and is described by many as the most appropriate way to assess and analyse motor skills (Branta, Haubenstricker & Seefeldt 1984; Holland 1986; Kelly, Reuschlein & Haubenstricker 1989). Although the instructional values of qualitative assessment is high, this type of assessment is not dominant (Davis 1984). According to Davis (1984) qualitative assessment procedures are not commonly used due to lack of training, lack of standardisation and lack of data to guide teachers in how to interpret student performances in tests.

This paper discusses an investigation which had the primary purpose of determining which age is the most appropriate to teach individual rugby league skills to primary school children in order to maximise learning. Although the games of Mini Footy and Mod League have been developed to accommodate different age groups of children, there has been little research into the readiness of children to acquire the specific skills of rugby league. The investigation examined the acquisition of three skills: the standing pass; the running pass; and receiving a pass.

These skills have been validated as among those skills considered essential for children to master in order to play rugby league (Aussie Sports Coaching Program: Rugby League 1988).

METHODS

Subjects

Subjects for this investigation were drawn from a local primary school in Armidale, New South Wales. At present the school has 180 students from kindergarten to year six of predominantly Anglo Saxon origin.

A total of 72 primary school students (male and female) were utilised as subjects for this investigation. The subjects were randomly selected from three age divisions (seven, nine and eleven), with twenty four students in each division. Subjects within each division were then randomly allocated to treatment and control groups (12 students in each group). Random allocation determined the number of males and females in each group (see Table 1).

Table 1:Distribution of subjects by age and gender.

AgeGenderTotal
MaleFemale
7131124
991524
11111324
Total333972

Procedures

This investigation involved subjects undergoing a skill assessment pre-test, followed by a skill development intervention which was then succeeded by a skill assessment post-test

Testing:

All students were pre and post-tested for the dependent variables (the standing pass; the running pass; and receiving a pass). Each of these skills were broken down into a number of different components. Each component of the skill was assessed by a professional rugby league development officer using an ordinal checklist. Proficiency in the skill component was rated on a scale of 0-5 (poor to excellent).

Procedures for the execution of each skill were standardised across all age groups. Only the size of grids and the distances passed differed between age groups.

Intervention:

The skill intervention was designed in conjunction with a professional

in the field of rugby league development and coaching. Essentially, the intervention consisted of a sequential skill development program focussing on the dependent variables. Skill techniques and activities for each skill were derived from numerous rugby league manuals and rugby league coaching booklets (Morton, Docherty, Evans 1981; Coffey and Webb 1987; Webb and Thompson 1987a, 1987b, 1987c; ; Aussie sports 1988; Bamford 1989 and Corcoran 1991a, 1991b).

All students received the same intervention for a period of four weeks, with one hour a week being allocated to each age division. A physical education teacher, who is also an experienced rugby league player, conducted all sections of the intervention.

RESULTS

Data was analysed using the doubly multivariate analysis of variance routine in the Super ANOVA statistical software package. The analysis was doubly multivariant because there were three dependant variables (standing pass, running pass and receiving a pass) and repeated measurements (pre-test and post-test intervention) were made of each variable for all subjects. Hence, there were two between factors - Group and Age; and one within factor - Time.

7 Year Olds

The results presented (see Table 2) reveal that the treatment group displayed a significant increase in their performance of the standing pass and running pass after the skill intervention. Results for the standing pass ($p \leq .0001$) and for the running pass ($p \leq .005$) illustrate a significantly high probability that the intervention was responsible for the increase of the students performance. Results presented for receiving a pass ($p \leq .3695$) revealed that the treatment group displayed no significant increase in their performance after the implementation of the skill intervention.

9 Year Olds

The results show that the treatment group displayed a statistically significant increase in their performance of the standing pass ($p \leq .0001$), running pass ($p \leq .0005$) and receiving a pass ($p \leq .0003$) after the administration of the skill intervention (see Table 2).

Table 2: Summary of results: Age by skill

Group
SkillMean &
S.DPre -TestPost -Test
ControlTreatmentControlTreatment
Standing Mean15.819.716.329.6*
S.D4.807.203.708.40
7Receiving Mean25.826.823.925.3
S.D2.802.202.705.00

Running Mean16.218.916.321.2***
S.D6.103.604.307.30
Standing Mean22.324.920.135.3*
S.D6.706.006.504.90
9Receiving Mean26.528.321.627.6**

S.D2.802.202.705.00
Running Mean19.522.418.626.2**
S.D3.404.102.505.20
Standing Mean23.927.524.937.0**
S.D4.005.405.206.10
11Receiving Mean24.927.623.830.9*
S.D3.502.103.703.00
Running Mean17.717.716.028.5*
S.D4.103.803.602.20
* p≤0.0001
**p≤0.0005
***p≤0.005

11 Year Olds

Results for the 11 year olds show that the treatment group displayed a significant increase in their performance of the standing pass, running pass and receiving a pass after the administration of the skill intervention program. Significance figures of p≤.0005 for the standing pass, p≤.0001 for the running pass and p≤.0001 for receiving a pass showed that the intervention had a significant improvement across dependant variables (see Table 2)

Relationships Between the Skills

Person Product Moment Correlations were carried out between pairs of skills to determine the extent of any relationship between the skills. As can be seen from Table 3, post test results for the standing pass and receiving a pass (r =.501), receiving a pass and the running pass (r=.583) and the standing pass and the running pass (r =.63) showed correlation co-efficient which indicate a moderate relationship between the pairs of skills.

Table 3: Pearson Product Moment Correlation Matrix for Dependent Variables

Standing pass pre-testStanding pass
post-testReceiving a pass pre-testReceiving a pass post-testRunning pass pre-testRunning pass post
Standing pass pre-test1
Standing pass
post-test.5991
Receiving a pass pre-test.3.411
Receiving a pass post-test.321.501.4681

Running pass pre-test.394.404.436.2011
Running pass post.385.63.408.583.4621

DISCUSSION OF RESULTS

Results suggested that the most appropriate age to teach the skills of standing pass, running pass and receiving pass to primary school students is nine or eleven. Both of these age groups illustrated substantial skill development, with a high levels of significance over all dependant variables (see Table 2). However, if each skill is assessed individually in relation to age, it seems there is a most appropriate age to teach each skill.

Standing Pass

Significance levels of $p \leq .0001$ for the seven years group, $p \leq .0001$ for the nine year group and $p \leq .0005$ for the eleven years group illustrate a high level of significance for all groups. Therefore in order to maximise learning, seven may be the most appropriate age to teach the standing pass (i.e., the younger the skill can be taught, the more time there is available for skill development).

Running Pass

Significance levels of $p \leq .0203$ for the seven years group, $p \leq .0005$ for the nine year group and $p \leq .0001$ for the eleven years group, illustrated a high level of significance for all groups. Therefore, once again, in order to maximise learning, seven may be the most appropriate age to teach the running pass.

Receiving a Pass

Significance levels of $p \leq .3695$ for the seven years group, $p \leq .0003$ for the nine year group and $p \leq .0001$ for the eleven years group illustrate a high level of significance for the nine and eleven years groups. The seven years group however, showed no significant increase in the skill of receiving a pass. Subsequently, it would seem that the most appropriate age to teach the skill of receiving a pass in order to maximise learning would be nine years old.

In relation to teaching skills in various combinations, it would appear to be beneficial to teach receiving a pass with either the running pass or the standing pass. As these combinations of skills yielded correlation of greater than $r = .5$, it can be said that there is a moderate relationship between these skills (Colton 1974).

CONCLUSIONS

It is important to note that the trend in physical education has been

to teach children in the pre-teenage years a broad cross section of motor skills, rather than focusing on the skills of any one particular sport or game. This paper clearly shows that motor development with respect to specific sports skills can be effectively learnt by the age of seven.

It is not the intention of the authors to suggest that the status quo should not remain, however it is worth noting that physical educators should pay close attention to the development of specific sports skills if the opportunity and/or need arises.

It can be seen from this study that not all sport specific skills can be taught at the one age. Most sports involve a number of skills of varying complexity, and this needs to be taken into account when examining at what age to teach the skill. Moreover, there are sports which incorporate such complex and intricate skills that the teaching of them would be best left until the early teenage years. Further to this, the complexity of a skill needs to be examined to see if its component parts can not be taught in preceding years to form a "skill platform" for future skill development. In this study, the teaching of the standing pass at age seven can lead to more rapid development of the running pass at age nine.

The complimentary nature of various skills is an aspect of skill learning which should be carefully planned for by the physical education teacher. This notion can be viewed from two varying perspectives:

a.If a teacher is wanting to maximise the learning that takes place in the development of specific sports skills within a given sport, it would seem an advantage to teach simultaneously those skills that compliment the development of other 'like skills'.

b.If the time frame for skill development is limited, and the teachers wants to cover as many skill aspects of a given sport as they can, it would seem logical to teach skills that are not highly positively correlated. In these circumstances, the teacher would be able to teach a wide variety of skills that could then provide a platform for the development of other skills. This latter skill development could possibly then occur without major emphasis in the formal teaching context.

Obviously there are compounding factors in the effective teaching of such skills. Teaching style and teaching strategies alone are two factors which could significantly effect the outcome of such any approach to teaching physical education. A sport specific approach requires the teacher to be au fait with the mechanics of the specific skill, but still be able to teach the skill in way that is enjoyable and rewarding to the students - the "coaching" style of teaching skills

in physical education should be avoided at all costs!

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