Research Article

Practitioner behaviours during Key Stage 3 and Key Stage 4 invasion games lessons

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**Abstract**

The aim of this study was to record the duration of practitioner behaviours displayed by teachers during Key Stage 3 and Key Stage 4 physical education lessons. A total of five physical education teachers were observed teaching five Key Stage 3 and five Key Stage 4 invasion games lessons at a state secondary school. Systematic observations were used to collect the data using an adapted version of the Coach Analysis and Intervention System. The total duration of each practitioner behaviour was recorded and a percentage for each behaviour out of the total lesson time was calculated. The results of the study indicated that when teaching Key Stage 3 lessons, teachers significantly displayed a longer duration of pre-instruction, post-instruction, convergent questioning and management behaviour when compared to teaching Key Stage 4 lessons. Silence on-task and reinforcement behaviour had a significantly higher duration within the teaching of Key Stage 4 invasion games lessons. The findings suggest that there are some significant differences in the behaviours displayed by physical education teachers when Key Stage 3 invasion games lessons and Key Stage 4 invasion games lessons.

Introduction

Previous research within education has focused heavily on teaching styles (Parker and Curtner-Smith, 2012; Byra, Sanchez and Wallhead,2014) and pedagogical issues (Armour and Harris, 2013). However, there has been limited research that identifies ‘what is happening’ within the teaching of physical education and the behaviours that are being displayed by physical education teachers.

Research based on teaching and coaching practitioner behaviour has focused predominantly on the behaviours of coaches within a sports coaching environment. Partington, Cushion and Harvey (2013) investigated the effect of athlete age on the coaching behaviours of professional soccer coaches. This research recognised significant differences in the level of instruction, feedback and questioning used at different age levels. These findings are supported by Morgan, Spray and Hartwood(2008) who explored the practitioner behaviours of sports coaches working with three different age groups of youth performers. The findings suggested that older performers received more feedback and instruction, whilst questioning was more common with younger performers. In contrast to these findings it has been reported that despite a recommended shift in practitioner behaviour with players’ age, a large amount of research has found no significant differences in the behaviours displayed when working with performers of different ages (Ford*,* Yates and Williams, 2010). It appears there is a need to explore the practitioner behaviours displayed by teachers when working with pupils in different key stages.

*The use of instruction*

Instructional behaviour is the information given relating to a desired action, and it can be given before the desired action (pre-instruction), during execution (concurrent instruction), or after execution (post-instruction). Previous research has suggested the importance of the instructional behaviours of physical education teachers and how the quality of instructional behaviours will influence the level of pupil learning (Carreira Da Costa and Pieron, 1992). Roberts *et al.* (2012) compared the practitioner behaviours displayed by physical education teachers and youth sports coaches within physical education lessons. The results of the study revealed that the dominant behaviours exhibited by both teachers and coaches were instructional-based behaviours.

*The use of questioning*

Questioning has been identified as an effective pedagogic teaching and coaching approach (Metzler, 2000). Convergent questions within physical education refer to the ‘what’ and ‘when’ of skill acquisition and divergent questions extend pupil understanding by encouraging decision making and higher order thinking (OFSTED, 1994). Partington *et al.* (2013) found that questioning was used much less often during youth football coaching sessions than instructional behaviours (7.2% compared to 43.9%). Questioning in this research tended to be more convergent (5.0%) than divergent (2.2%). McNeill *et al.* (2008) stated that for tactical awareness and games understanding to evolve, much greater emphasis needs to be placed on divergent questioning that encourages higher order thinking and decision making.

*The use of feedback*

Total feedback (a combination of knowledge of performance, knowledge of results and reinforcement) provided to performers has been found to be higher for older age groups than younger age groups within youth football (Partington *et al*., 2013). More feedback was given to the under 14s and 15/16s (14.5%) compared to the under 12s and 13s (10.6%) and to the under 10s and 11s (5.8%). The use of knowledge of performance feedback increased greatly from Under 10s and 11s (2.6%) to under 14s and 15/16s (10.0%), whereas the increase in knowledge of results feedback (increase of 0.3%) and reinforcement (increase of 1.0%) was not as large.

*The use of silence*

Smith and Cushion (2006) have supported the use of silence within a teaching environment, arguing that it is inextricably linked to observation and reflective practice and that when used correctly it may facilitate discovery learning. Silence has been categorised into silence on-task, where the coach actively observes and silence off-task, where the coach is visibly disengaged (Cushion *et al*., 2012). Partington *et al.* (2013) found that a performers’ age did not affect the use of silence by coaches.

*Management behaviour*

Roberts *et al.* (2012) found that both physical education teachers and sports coaches recorded high frequencies of management within physical education lessons. These recorded high levels of management behaviour within the teaching of physical education and sports coaching are consistent with other recent studies exploring practitioner behaviour (Ford *et al.,* 2010; Roberts & Fairclough, 2011).

The aim of this study was to record the duration of practitioner behaviours displayed by teachers during Key Stage 3 and Key Stage 4 physical education lessons.

**Method**

The participants involved in the study were five fully qualified PE teachers (four male, one female). The participants were aged 24-47 (M=31 years) and had on average nine years of teaching experience. All of the participants taught at the same state comprehensive school situated in the South West of England. The participants were given an information sheet detailing the aims of the study and they all provided written consent. Ethical approval was granted by the University’s ethical committee.

The participants were filmed teaching one Key Stage 3 invasion game lesson and one Key Stage 4 invasion game lesson. A total of ten lessons were video recorded. Filming began when the participant and all of the pupils reached the teaching space, and continued for the duration of the lesson. The total time recorded for Key Stage 3 lessons was 216 minutes and 51 seconds; the total time recorded for Key Stage 4 lessons was 189 minutes and 38 seconds.

From the video recordings, systematic observations were conducted to collect data on the practitioner behaviours displayed by the participants during the lessons. The instrument used for the systematic observations was an adapted version of the CAIS (Cushion *et al.*, 2012). The definitions of the practitioner behaviours that were recorded are displayed in table 1. Practitioner behaviours were recorded when the teacher entered the teaching environment and ended when the class were asked to return to the changing rooms.

**Table 1. Practitioner behaviour definitions (adapted from Cushion *et al.,* 2011).**

|  |  |
| --- | --- |
| Practitioner Behaviour  | Definition |
| Pre-instruction | Initial information/instruction given preceding the desired action |
| Concurrent instruction  | Cure, reminders, prompts (given during execution of the desired action) |
| Post-instruction  | Information given after the execution of the desired action |
| Convergent questioning | The practitioner asks a convergent question which has a limited number of correct answers/options – more closed |
| Divergent questioning  | The practitioner asks a divergent question which has multiple responses/options – more open  |
| Response to a question  | The practitioner responds to a question that may or may not be directly related to practice  |
| Feedback - Knowledge of results | The practitioner gives feedback on the outcome of an action |
| Feedback - Knowledge of performance  | The practitioner gives information on the movement pattern that causes the result |
| Reinforcement | Corrective statement that contain information to correct and improve the next attempt/a participants performance (can be delivered concurrently or post) |
| Positive feedback | Feedback from the practitioner that is positive  |
| Negative feedback | Feedback from the practitioner that is negative  |
| Silence (on-task) | The practitioner monitors practice without reacting verbally or non-verbally, maintaining eye contact with the players |
| Silence (off-task) | The practitioner is visibly not engaged in the practice  |
| Management  | Management of the participants - related practitioner behaviours contributing directly to practice |
| Humour  | Jokes or content designed to make participants laugh or smile |
| Hustle  | Behaviour designed to increase the intensity of performance |
| Praise | Positive or supportive statements or gestures not relating to a specific skill attempt |
| Punishment  | Specific punishment following a mistake  |
| Scold | Verbal or non-verbal behaviours demonstrating displeasure at the participant/s performance  |
| Other | Any other behaviour not fitting any of the categories |

*Reliability*

Inter-observer and intra-observer reliability analyses were conducted to assess the objectivity and reliability of the data respectively. For the inter-observer reliability, an analyst who possessed two year’s of analysis experience, observed one of the lessons (approximately 10% of the data collected). The analyst was given a four hour training session and was provided with the practitioner behaviour definitions. The data collected by the analyst was compared to the data collected by the initial observer. The intra-observer reliability analysis was conducted by the initial observer analysing one of the lessons (approximately 10% of the data collected) from the original sample. This was carried out two weeks after the initial analysis to reduce potential learning effects. Percentage error was calculated to assess both inter-observer and intra-observer reliability.

**Table 2. Percentage error for inter-observer and intra-observer reliability.**

|  |  |
| --- | --- |
| Reliability test | Percentage error |
| Inter-observer | 13.4% |
| Intra-observer | 10.9% |

#### Data analysis

The time (seconds) that each practitioner behaviour was displayed for was recorded for the five Key Stage 3 lessons and the five Key Stage 4 lessons. The percentage time of each practitioner behaviour was calculated in relation to the total lesson time for Key Stage 3 and Key Stage 4. After visually exploring the data through histograms, paired-samples t-tests were utilised to compare the percentage time for pre-instruction, post-instruction, convergent questioning, reinforcement, silence (on-task) and management between Key Stage 3 lessons and Key Stage 4 lessons. The alpha level was set at 0.05.

**Results**

Within the teaching of Key Stage 3 lessons, the behaviour with the greatest duration was management, with a total from the five lessons of 2189s (16.9% of the total lesson time). The next greatest duration was silence on-task, with 1891s (14.5%) recorded for this behaviour; in contrast silence off-task was considerably lower at 735s (5.6%). Questioning took place for a total recorded time of 1002s (7.7%) with convergent questioning (5.3%) having a greater duration than divergent questioning (2.4%). The teaching behaviour with the greatest duration within Key Stage 4 PE lessons was silence on-task with a total time of 2864s (24.6%). Reinforcement was the next greatest duration with 1051s (9.3%) recorded. Silence off-task (8.7%) and management (8.5%) were also displayed for a considerable duration.

**Table 3. Practitioner behaviours within Key Stage 3 and Key Stage 4 lessons.**

|  |  |  |
| --- | --- | --- |
| Practitioner Behaviour | Key Stage 3 | Key Stage 4  |
| Duration of behaviour (s) | Percentage duration of total lesson time (%) | Duration of behaviour (s) | Percentage duration of total lesson time (%) |
| Pre-instruction | 1474 | 11.3 | 697 | 6.2 |
| Concurrent instruction | 689 | 5.3 | 372 | 3.4 |
| Post-instruction | 751 | 5.6 | 223 | 2.0 |
| Convergent Questioning  | 691 | 5.3 | 365 | 3.2 |
| Divergent Questioning | 311 | 2.4 | 359 | 3.2 |
| Response to a Question | 500 | 3.9 | 395 | 3.5 |
| Feedback – Knowledge of results  | 161 | 1.3 | 221 | 2.0 |
| Feedback – Knowledge of performance | 232 | 1.8 | 259 | 2.3 |
| Reinforcement | 841 | 6.5 | 1051 | 9.3 |
| Positive feedback  | 413 | 3.2 | 541 | 4.7 |
| Negative feedback | 292 | 2.2 | 329 | 2.9 |
| Silence (on-task) | 1891 | 14.5 | 2864 | 24.6 |
| Silence (off-task) | 735 | 5.6 | 988 | 8.7 |
| Management | 2189 | 16.9 | 928 | 8.5 |
| Hustle  | 587 | 4.5 | 669 | 6.0 |
| Humour | 134 | 1.0 | 287 | 2.5 |
| Praise | 431 | 3.3 | 255 | 2.3 |
| Punishment | 49 | 0.4 | 115 | 0.9 |
| Scold | 373 | 2.7 | 318 | 2.8 |
| Other | 267 | 2.0 | 142 | 1.2 |

Statistical analysis showed that there was a significant difference in the percentage duration of the six behaviours analysed when comparing Key Stage 3 lessons to Key Stage 4 lessons. There was a significantly greater duration of pre-instruction (p=0.016) and post-instruction (p=0.001) in Key Stage 3 lessons compared to Key Stage 4 lessons. Management (p=0.001) was significantly greater in duration in the teaching of Key Stage 3 pupils compared with Key Stage 4 pupils. The final teaching behaviour that was significantly greater in duration in Key Stage 3 lessons than Key Stage 4 lessons was convergent questioning (p=0.048). There was a significantly greater duration of silence on-task (p=0.031) during Key Stage 4 lessons compared to Key Stage 3 lessons. There was also a significantly greater duration of reinforcement (p=0.025) in Key Stage 4 lessons.

**Table 4. Paired-samples T-tests.**

|  |  |
| --- | --- |
| Practitioner Behaviour | Paired-samples T-test |
|  |
| Pre-instruction | 0.016\* |
| Post-instruction | 0.001\* |
| Convergent Questioning  | 0.048\* |
| Reinforcement | 0.025\* |
| Silence (on-task) | 0.031\* |
| Management | 0.001\* |

\*Significant finding (below 0.05).

**Discussion**

The aim of this study was to record the duration of practitioner behaviours displayed by teachers during Key Stage 3 and Key Stage 4 physical education lessons. The findings of this study suggest that the duration of practitioner behaviours differ significantly between Key Stage 3 and Key Stage 4 lessons for six of the twenty key practitioner behaviours.

#### The use of instruction

There were significant differences for the percentage duration of pre-instruction (p=0.016) and post instruction (p=0.001). There was a significantly greater duration of pre-instruction and post-instruction in Key Stage 3 lessons compared to Key Stage 4 lessons. In the current study, 22.2% of the duration of practitioner behaviour within Key Stage 3 lessons was instructional in nature, whereas, for Key Stage 4 lessons it was 11.6%. This supports Partington *et al.* (2013) who stated that there was a higher frequency of instructional behaviour when coaching younger age groups than when coaching older age groups. Interview data within the Partington *et al.* (2013) study suggested that coaches of younger age groups often repeat instructions, and find it ‘quicker to give information’ rather than allowing players time to make decisions independently. The coaches of older age groups tended to use less instruction to allow the players to learn independently. This could provide an explanation for the greater duration of instructional behaviours within Key Stage 3 lessons compared to Key Stage 4 lessons. Within this current study, less instructional behaviours by the participants during Key Stage 4 invasion games lessons could provide the pupils with more opportunities than the Key Stage 3 pupils to develop their decision making and problem solving.

*The use of questioning*

There was a significant difference for the percentage duration of convergent questioning (p=0.048) within Key Stage 3 lessons and Key Stage 4 lessons. There was a significantly greater duration of convergent questioning in Key Stage 3 lessons compared to Key Stage 4 lessons. There was no significant difference for divergent questioning (p=0.362) within Key Stage 3 and Key Stage 4 lessons. In Key Stage 3 teaching, questioning tended to be more convergent rather than divergent, whereas there was an identical duration percentage of convergent and divergent questioning within Key Stage 4. Mawer (1995) stated that the higher frequency of convergent questions within a lesson reflects the teacher’s need to demonstrate the pupils’ ability to recall information they have previously been given. Divergent questions may provide a wider variety of answers, however, the questioning process can become lengthy and detract from activity time. This could provide an explanation for why teachers display less divergent questioning compared to convergent questioning within Key Stage 3 lessons. However, McNeil *et al.* (2008) identified that for the effective teaching of team invasion games, the emphasis needs to be on divergent questioning rather than convergent questioning.

There was a lower duration of questioning behaviour compared to instructional behaviour.This supports both Roberts *et al.* (2012) and Partington *et al.* (2013), who reported low levels of questioning compared to instruction. McNeil *et al.* (2004) identified questioning to be a major pedagogical issue within physical education. It was reported that teachers felt the use of questioning decreased the time available for pupils to be active within the lesson, which could provide an explanation for the results found in the current study.

*The use of feedback*

The duration of total feedback (a combination of knowledge of performance, knowledge of results and reinforcement) was higher for Key Stage 4 lessons (13.6%) compared to Key Stage 3 lessons (9.6%). Partington *et al.* (2013) discovered a similar finding within youth soccer where the coaches gave more feedback when coaching the older youth players. The increase in total feedback was mainly caused by a significant increase in the duration of reinforcement feedback. It appears that the practitioners were more likely to provide corrective statements to enhance pupil performance within Key Stage 4 lessons compared to Key Stage 3 lessons. The use of reinforcement feedback within physical education lessons is a key behaviour for practitioners to reflect on as it can help to develop the intrinsic motivation and confidence of participants (Hays *et al.,* 2007).

*The use of silence*

The duration of silence on-task (p=0.031) was significantly greater during Key Stage 4 lessons compared to Key Stage 3 lessons. Silence on-task behaviour was displayed more often than silence off-task behaviour. This could imply that the teachers are using silence as a conscious teaching/coaching strategy (Smith and Cushion, 2006; Potrac, Jones and Cushion*,* 2007). Teachers who engage in silence on-task behaviour can actively observe the pupils and this can be a vital tool in enabling ‘discovery learning’ (Smith and Cushion, 2006). This behaviour could have a positive impact on pupil learning and physical education teachers should reflect on their use of this behaviour.

*Management behaviour*

Management behaviour was significantly greater (p=0.001) in duration in the teaching of Key Stage 3 lessons compared to Key Stage 4 lessons. There was a long duration of management behaviour within Key Stage 3 lessons (16.9% of total lesson time) and this links to Roberts *et al.* (2012) finding that both physical education teachers and sports coaches recorded high frequencies of management within physical education lessons. There may be a need for practitioners to reduce the duration of management behaviour within Key Stage 3 lessons to reduce the monolithic power relationship which exists between physical education teachers and pupils. This may encourage pupils to take more responsibility for their own learning and development (Ford *et al.*, 2010; Roberts *et al*., 2012).

*Limitations*

This study only provided quantitative data on the practitioner behaviour. Although the research has been successful in identifying the duration of practitioner behaviours within Key Stage 3 and Key Stage 4 lessons, it is unable to offer any explanation into the cognitive processes that underpin the practitioner behaviours demonstrated. It has been recommended that in order to aid the interpretation of practitioner behaviour, the use of quantitative data collection through the use of systematic observation should be supported by the interpretation of qualitative data collected through the use of questionnaires or interviews (Potrac, Jones and Armour, 2002; Smith and Cushion, 2006; Ford *et al.*, 2010). Secondly, a key limitation of the study is the sample size. A total of five participants were observed and the small sample size may be unrepresentative of the population as a whole. The research was also conducted within one state secondary school and therefore the findings of this study may not be representative of the whole population and caution needs to be taken when generalising the findings. Finally, the practitioner behaviours recorded were taken from the adapted version of the CAIS. This system was developed primarily for analysing sports coaching behaviours. Further reflection is required to analyse its use for recording physical education teaching behaviours.

**Conclusion**

The aim of this study was to record the duration of practitioner behaviours displayed by teachers during Key Stage 3 and Key Stage 4 physical education lessons. The findings of this study suggest that the duration of practitioner behaviours differ significantly between Key Stage 3 and Key Stage 4 lessons for six of the key practitioner behaviours. Pre-instruction (p=0.016), post instruction (p=0.001), management (p=0.001) and convergent questioning (p=0.048) behaviour were significantly greater in duration for Key Stage 3 lessons compared to Key Stage 4 lessons. Silence on-task (p=0.031) and reinforcement (p=0.025) behaviour were significantly longer in duration for Key Stage 4 lessons compared to Key Stage 3 lessons. It would be suggested that physical education teachers should reflect on the behaviours that they display within lessons and with pupils in different key stages. Future research should consider the use of interviews in conjunction with systematic observations when exploring teaching behaviours within physical education lessons. This could help to provide an explanation of the cognitive processes that underpin the behaviours displayed.

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