

MAKING PHYSICAL EDUCATION A KNOWLEDGE-RICH SUBJECT

A knowledge-rich physical education curriculum

The curriculum is front and centre of the Education Inspection Framework (Ofsted, 2019). The expectation of an “ambitious knowledge-rich curriculum” has led to a critical engagement in the why(s), what(s) and how(s) of physical education (PE) by the profession. Subject leaders of PE, both in primary and secondary schools, are working hard to ensure the construction of a knowledge-rich curriculum, but before deciding on what knowledge should be included in a PE curriculum, a critical question around the nature of knowledge needs to be answered.

The Research Review in PE (Ofsted, 2022) presents the evidence of the factors that influence the quality of PE in schools in England. It highlights two types of knowledge that are important in curriculum planning: declarative and procedural knowledge. Declarative knowledge “is the factual knowledge concerning movement, rules, tactics, strategies, health and participation” (Ofsted, 2022). An example of this might be teaching children to understand the choreographic devices that could be used in the creation of dance or gymnastics sequences, such as unison, cannon, matching and mirroring. By increasing children’s declarative knowledge about movement, they will be better able to communicate their ideas, analyse their own or their peers’ performances and explain the decisions that they make during an activity or one that they observe.

If declarative knowledge can be considered as ‘know what’ then procedural knowledge is ‘know how’. Procedural knowledge is the capability to move and perform skilfully. Ofsted (2022) uses the example of outwitting an opponent in rugby. A child may be able to explain how they might beat a flat line defence (declarative knowledge) but that is different from being able to do it within a drill or game context (procedural knowledge). This is the same for the choreographic devices example mentioned previously. A group of children can demonstrate their declarative knowledge by planning a dance routine to use unison and canon

and their procedural knowledge by performing the dance routine with both.

Knowledge of the environment

Whilst both declarative and procedural knowledge are obviously important for learning to move and living a physically active life, we feel there is one important type of knowledge that is, worryingly, being overlooked. James Gibson, an ecological psychologist, provides a distinction that we believe PE teachers need to consider in their curriculum planning. The distinction Gibson (2014) makes is ‘knowledge *about* the environment’ and ‘knowledge *of* the environment’. Knowledge about an environment is similar to declarative knowledge. It is the knowing of a situation, such as the lay-up is a way to score in a game of basketball. Knowledge *of* an environment refers to the skilful perception and action that would allow a player to recognise when a lay-up would be appropriate and perform it in a game context (Woods *et al.*, 2020b).

Ofsted (2022) states that declarative knowledge and procedural knowledge are two sides of the same coin but goes on to further position declarative knowledge as being essential for procedural knowledge to be developed. This imbalance is concerning, especially for how it may shape practice design, teaching behaviours and curriculum structure. Research has found that procedural knowledge can have a positive impact on the development of declarative knowledge (Williams and Davids, 1995). Furthermore, it has been suggested that procedural knowledge outdates declarative knowledge (Ten-Berge and Van-Hezewijk, 1999), hence it could be said the development of knowledge through movement is a complex two-way interaction of knowing and doing in PE.

We believe that knowledge *of* the environment is important to develop procedural knowledge and facilitate learning to move. To clarify this position, we will explain skill from a knowledge *of* the environment perspective and how paying attention to key informational sources from movement contexts are an important part of a knowledge-rich PE curriculum.



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Skill

Our definition and understanding of skill often stems from being taught or teaching the content of examination PE. We might remember this definition, “The learned ability to bring about pre-determined results with maximum certainty, often with the minimum outlay of time, energy or both” (Knapp, 1963). An alternative is “Skill is an athlete’s ability to choose and perform the right techniques at the right time, successfully, regularly, and with a minimum effort... skill is acquired and therefore has to be learned” (Mackenzie, 2001). These definitions of skill have been at the forefront of the PE profession and have influenced past and present PE experiences, lesson structure and curriculum design. This emphasis has led to a subject that focuses on motor programmes, movement invariance and repetitive practice of idealised technique.

It is important to understand that there are alternative perspectives of the term skill. From a knowledge of the environment perspective, Woods and colleagues posit that “skilled actions are embedded, encultured, dynamic, body-environment interactions” (2020a, p. 4). Skill can be viewed as a dynamic interaction between body and environment, rather than a set of programmed abilities that reside within our bodies. This indicates that the environment has a key role to play in the development of skills. This idea is further developed by Davids *et al.* (2021) who imply that individuals and teams are complex adaptive systems and that it is the interaction with the environment that defines their level of skill. Skill therefore is being able to adapt and form movement solutions through the process of perception-action. When performing in sport the outcome is often dependent on an individual’s ability to determine when a behaviour is possible and when it is not (Fajen, Riley and Turvey, 2008). This viewpoint suggests that a skilled performer is not necessarily someone who has repeatedly practised techniques to build an arsenal of ready-to-use solutions, rather someone who can respond to the environment and self-organises to solve a given problem. From a knowledge of the environment perspective, skill is therefore determined by the interactions and solutions enacted in the situation and context depending on the desired outcome (Smith, 2013).

Ovens and Smith suggest that skill is a “specific form of competency inseparable from its context” (2006, p. 76). In search of clarity, it is beneficial to distinguish between action, technique and skill. An example of this is provided through the consideration of a pass in football. The relatively simple act of passing a ball involves moving the ball to a teammate. To pass the football well, techniques are used to provide a level of control and accuracy over the action. Passing a football can be done in various contexts: it could be on the playground with friends or in a high-pressure environment provided by competition. Context becomes important in determining when the act becomes a skill. The skill of passing a football is when the pass is situated in a game context or when the performer has to make decisions as a response to a situation they find themselves in. This could be holding onto the ball for the receiving player to move into space or moving the ball quickly to exploit available space created by an overlapping player. Either way, the skill of passing a football extends beyond the technique as the environmental factors require the player to consider the why, when, how and where to pass depending on the situation. In this sense, skill is a “situated act specifically because it is dependent on contextual factors” (Ovens and Smith, 2006, p. 76).

Information

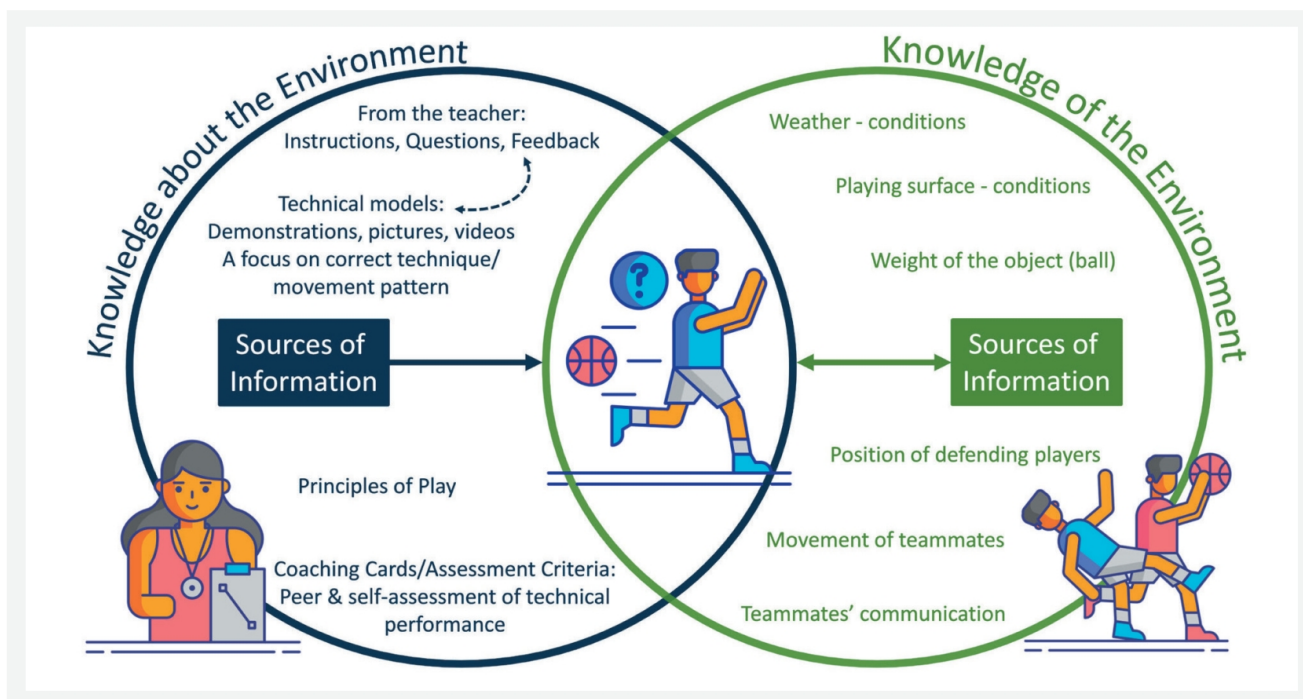
The information we share with students is often drawn from our own PE experiences, teacher education, experienced members of our department, coaching or teaching manuals and social media clips of elite coaches in the performance domain. This information is what we want pupils to pay attention to and, as a result, shapes our curriculum, teaching and assessment within PE.

When we talk about information from a knowledge of the environment perspective, we move away from the facts and the general information regarding a state of affairs within PE and gravitate towards the live and relational information that is available to pick up within an environment. This information is highly unique for an individual, dynamic in nature and requires searching for and interacting with on a consistent basis (Gibson, 2014). For example, a student may be finding shooting accurately in netball a simple task to complete during the unopposed part of the lesson. However, when the lesson moves into a more complex scenario, such as in the presence of a defender, they may find it difficult to score a point. One solution could be for the teacher to provide the student with information on the correct technique via teaching points or modelling through demonstration. The assumption here is that this type of information (declarative knowledge) is the first step in achieving this task goal and will aid in regulating action (procedural knowledge), thus improving learning and overall performance. However, as we have discussed in the previous section, being able to perform the technical movement is only one aspect of the skill story (action) and is no use if the student is unaware of how to adapt their actions to navigate a defender blocking the net or if they do not consider the relative information of space and time to perform the shot. Hence, the second aspect of this movement story (perception) is an essential and inter-dependent component to achieving a task goal.

It is important to note that perception is not merely seeing the space and opponents around us; it is about picking up on the information and opportunities these factors offer or afford in relation to our personal capabilities. Gibson (1977) called this concept a theory of *affordances* and it has implications for teaching and learning as information can no longer be viewed as a one-size-fits-all truth or fact. This point is further reinforced by Juarrero (1998) who describes information as a context-dependent constraint. Therefore, what is information for one student may not be information for another and this changes when the individual, task or environment change. The regressive impact on coordination due to rapid gains in limb length during the adolescent growth spurt is a timely reminder that our abilities to move efficiently and effectively are never fixed in time (Lloyd and Oliver, 2012).

In order to develop the knowledge and skills to move efficiently and effectively in a variety of contexts, we should keep as much of the contextual information in the lesson as we can, whilst using our professional judgement and decision-making skills to dampen (or amplify) where appropriate to meet the needs of the students we teach (Rudd *et al.*, 2021).

“Practice, when properly undertaken, does not consist in repeating the means of solution of a motor problem time after time, but in the process of solving this problem again and again by techniques which we changed and perfected from repetition to repetition.”
(Bernstein, 1967, p. 134)



This quote by the motor scientist Nikolai A. Bernstein is important to bear in mind. Constantly transmitting the 'correct' technical information via verbal instructions and feedback could make students dependent on us for the answers and interfere with them developing their own perceptual skills to pick up on the information needed to solve the movement problems they may face along their PE journey. By balancing the emphasis on knowledge of the environment our role as a PE teacher becomes one of creating and exposing students to varied and information-rich learning environments in addition to instruction, feedback, modelling and practising correct technique.

Summary

A knowledge-rich PE curriculum should look to address declarative knowledge, procedural knowledge and knowledge of the environment. The imbalance within the Research Review (Ofsted, 2022) of favouring declarative knowledge over procedural, combined with the lack of attention to knowledge of the environment, can significantly shape what is provided to students and how they experience their PE lessons. The danger is that this imbalance could lead to PE becoming a subject where, through knowledge organisers and multiple-choice questions, students know everything about movement but are strangers to moving itself.

By ensuring knowledge of the environment is a part of their curriculum design, PE teachers can prioritise the relational quality that is found when a student is participating in a form of physical activity. Importance will be given to the relationship between the student and information in realistic and authentic contexts, for them to skilfully read and adapt to the demands of that context, and a holistic development between

the individual-environment fit that contributes to wellbeing. Learning to move requires an adaptive relationship with the specific environment in which one is performing. The knowledge needed to move and find a place for movement in one's life does not live solely inside the head of an individual but between them and the environment.

By answering the question about the type of knowledge that PE should look to address, the question of how to teach this type of knowledge raises its head. One way that PE teachers can look to pay attention to knowledge of the environment in their curriculum is through a set of design principles (non-linear pedagogy) and a teaching approach that focuses on the manipulation of constraints (constraints-led approach). The theory and the practical application of both will be the focus of our next two articles.

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