HOSTED BY

ELSEVIER

CrossMark

Available online at www.sciencedirect.com

ScienceDirect

Journal of Sport and Health Science 4 (2015) 119–124

www.jshs.org.cn

Review

Knowledge, transfer, and innovation in physical literacy curricula

Catherine D. Ennis

Department of Kinesiology, University of North Carolina at Greensboro, Greensboro, NC 27412, USA

Received 17 February 2015; revised 28 February 2015; accepted 1 March 2015
Available online 10 April 2015

Abstract

Literate individuals possess knowledge and skill and can apply these to perform tasks in novel settings. Knowledge is at the heart of physical literacy and provides the foundation for knowing what to do and how and when to perform. In this paper I argue that physical literacy includes not only knowledge for performance but also the ability to apply knowledge and use knowledge for innovation. Scholars since the 1930s have addressed the role of knowledge in physical literacy designing curricula centered on transmitting knowledge through a range of interdisciplinary approaches to physical education. This emphasis on physical literacy curricula continues today in the *Science, PE, & Me!* and *The Science of Healthful Living* interdisciplinary curricula.

Keywords: Application; Innovation; Interdisciplinary; Learning; Literacy; Transfer

1. Introduction

In simple terms, literacy is the idea that an individual has skills to access knowledge. Literacy assumes a lifelong process of gaining meaning with the goal of acquiring a progression of knowledge and skills that culminates in deep understanding.[1] Literate individuals not only have acquired knowledge and skills but also feel confident to exhibit them without fear of ridicule or accusations of difference. Knowledge, too, is at the heart of physical literacy and provides the foundation for knowing what to do and how and when to perform. In fact, physical literacy cannot occur without knowledge. Knowledge of facts, procedures, principles, and concepts and their cognitive and physical applications permit physically literate individuals to transfer knowledge to new contexts, solving previously unencountered problems in novel situations.[2]

Thus, one criterion of literacy might be context-specific and context-flexible knowledge or the ability to learn knowledge of something in one context and apply it effectively in another. Application or transfer, however, cannot occur without the knowledge, itself. When individuals learn something of value in a literacy-oriented curriculum, they can use it to innovate and create within novel future applications. In this paper, I will first review the theoretical basis for knowledge, transfer, and innovation as essential criteria for physical literacy. In the next section I will provide a brief discussion of knowledge-based, interdisciplinary physical education (PE) curricula that have provided a historical foundation for current conceptualizations of literacy programming. In the final section I will apply the constructs of knowledge, transfer, and innovation to elaborate the potential of physical literacy as a goal of two learning-oriented curricular models: *Science, PE, & Me!* (SPEM) and *The Science of Healthful Living* (SHL).

2. Curriculum for physical literacy

PE and physical activity curricula in the United States and other Western countries often have been permitted to drift away from expectations of knowledge and standards of performance,[3] focusing instead on accommodating vocal, skilled students' interests or enjoyment. Without strong teacher guidance in PE, students can subvert goals associated with in-depth knowledge of the physical and through the physical[4] focusing instead on immediate, short-term rewards.[5] The

E-mail address: c_ennis@uncg.edu
Peer review under responsibility of Shanghai University of Sport.

2095-2546/$ - see front matter
http://dx.doi.org/10.1016/j.jshs.2015.03.001

consequences of this negligence have been unskilled children and adolescents who do not demonstrate physical literacy.[6] Further, if physical literacy requires the ability to transfer skills from the school PE context in which they are learned to apply them in previously unencountered settings, then new expectations for physical literacy will stretch our current standards beyond our traditional team sports roots.[7] In fact, when physical literacy requires knowledge application and the ability to perform competently at home, during leisure, in natural environments, or across the lifespan, our current practices of PE as physical activity participation may quickly become antiquated and obsolete.

2.1. Foundations of literacy: transmitting knowledge and skills

Curriculum theorist, Michael Young[8] argues the most critical educational question teachers face is "What do I have the *responsibility* to teach my students?" Although not specifically discussing physical content, Young reminds us that this question is associated with knowledge and skills and the varied way knowledge can be used in the present and the future. Literacy from this perspective requires deep learning of critical concepts, principles, and procedures and the application of knowledge for performance.[2]

Teachers have many and varied responsibilities in schools. Certainly, their second responsibility, after student safety, is a most traditional one. It is the teacher's role as a representative of a culture or society to *transmit* culturally sanctioned knowledge to each new generation of learners.[9] As physical educators, for example, we could argue that one aspect of culturally sanctioned knowledge is associated with skills necessary to project objects through space. Following this premise, we believe teaching all young children to throw objects with opposition and power is as important today as it was a century ago. Certainly, throwing is a foundational or physical literacy skill that once learned, permits students to build their object projection capacities, applying them flexibly to learn other related skills within a range of games and sports. Fundamental physical literacy skills, such as throwing, probably remain relatively unchanged across generations and most would agree that throwing with opposition is a skill essential for every child.[7]

We must, however, look further and perhaps differently to respond to extensions of the responsibility question, such as, "What constitutes essential knowledge, skills, and abilities necessary for learners to move *beyond* current understandings?"[9] Thus, instead of simply learning or reproducing prior performances, individuals can be guided to discover ways to deepen, extend, and apply transmitted knowledge authentically in their lives.[2] In other words, providing students with both access to skillfulness required to participate competently and a level of mindfulness to experience the activity deeply and meaningfully stretches our current definitions of physical literacy and encourages us to explore new educational avenues for students.[10]

The idea that curricula and teaching can involve students in the present *and* prepare them for the future is a highly challenging task. Current approaches to PE curricula need revision to both engage students in physically active school environments and also prepare them to apply and use knowledge and performance skills in their lives after PE.[11] To address this two-fold goal, curriculum designers must be inspired to transform curricula beyond simple reproduction of movement patterns to apply skills in previously unencountered situations, think critically and creatively about when and how to apply skills, and question potential biases and limitations associated with transmitted knowledge.[12]

2.2. Knowledge for application

Young[8] emphasizes that to accept both transmission and application as relevant to the current educational questions associated with literacy is to acknowledge both the *reliability* of knowledge as a foundation for competence and performance and the constantly evolving nature of meaningful life applications of that knowledge. In other words, students who are physically literate not only can demonstrate knowledge and skill but also can transfer well-learned skills to complex, fast-paced games, the progressive overload principle to their daily workout plan, and cooperative skills to solve adventure challenges on the ropes course or on the trail. Physical educators who aspire to instill physical literacy encourage students to make these decisions and choices in a teacher-supportive environment.[13,14]

Cobo[15] argues that literacy includes the ability to apply skills learned in educational contexts flexibility to other more operational or functional contexts. This might mean opportunities to use bicycling skills outside the gym or playground on park and mountain trails or to examine the challenges of bicycle racing such as might be found in sports such as bicycle motor cross (BMX) racing. Knowledge application is critical for problem solving and critical thinking skill development essential both within physical and other forms of educational literacy.

Certainly, physical activity should be enjoyable to all, although it often isn't. Students who are not literate' who have not acquired basic skills and skill themes, or who have not developed an acceptable level of cardiovascular endurance are not likely to value participating in physical activities, regardless of how much they are enjoyed by their vocal, enthusiastic, skilled classmates.[6] It is unlikely, however, that most students will gain a level of physical literacy by participating in loosely organized team activities that often pass for the PE curriculum in the 21st century. Selecting physical activities simply to entertain or to promote target heart rate begs the question of literacy.[16]

2.3. Knowledge for innovation

Cobo[15] affirms the importance of transfer and adds two additional literacy goals: learning "how" in addition to learning "what" and lifelong/"lifewide" literacy. Cobo argues