
Navigating the Intelligence Layer : The Promise and Paradoxes of AI in Physical Education and Sport

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ABSTRACT

This article synthesises a lecture by Lucy Mills on the integration of Artificial Intelligence (AI) into sport and physical education (PE). The central thesis is that while AI presents transformative opportunities for the sector, its adoption must be guided by a discerning, human-centred, and ethically-grounded strategy. The article first demystifies AI, explaining the current “AI boom” as a confluence of big data, cloud computing, and deep learning. It then explores the dual nature of AI’s impact through a “promise and paradox” framework. The promise includes personalisation at scale, time-saving automation, enhanced data-driven insights, and more compelling storytelling. However, each promise is shadowed by a paradox: personalisation risks eroding independent thought; automation can lead to over-dependency; enhanced insights may result in over-analysis and the crowding out of spontaneous play (the Jevons Paradox); and data-driven engagement can devalue intrinsic effort. The article concludes by outlining a practical roadmap for navigating the AI era, emphasising the need for organisational AI readiness, a problem-first approach to innovation, the safeguarding of unstructured activity, and a steadfast focus on using AI as a tool to amplify positive human and social outcomes, rather than as an end in itself.

INTRODUCTION

Artificial Intelligence (AI), once the domain of science fiction and specialised research labs, has rapidly evolved into a pervasive “intelligence layer” that is reshaping industries, societies, and daily life. From the algorithms that recommend content on streaming services to the complex systems that guide autonomous vehicles, AI is no longer a future prospect but a present-day reality. The field of sport and physical education (PE) is not immune to this transformation. AI-powered tools are increasingly being developed and deployed with the promise of revolutionising how we teach, learn, play, and perform.

This article synthesises a lecture by Lucy Mills, a leading expert on technology and sport, which provides a pragmatic and critical examination of AI’s role in the PE sector. The presentation moves beyond the typical hype cycle of technological innovation to offer a nuanced perspective, balancing the significant potential of AI with a clear-eyed assessment of its inherent risks and paradoxes. The central thesis is that for the PE community, navigating the AI era is not a matter of blind adoption but of careful discernment. The goal should not be to simply “keep up” with technology, but to strategically and ethically integrate AI in a way that aligns with the core values of education, well-being, and human development.

The lecture deconstructs the current AI landscape, explaining the technological and economic forces driving the “AI boom.” It then introduces a powerful “promise and paradox” framework to analyse the application of AI in PE, exploring how the same technologies that offer personalisation and efficiency can also foster dependency and undermine intrinsic motivation. Finally, it provides a set of practical guidelines for educators, administrators, and policymakers. This article will unpack these key themes, providing a comprehensive overview of Mills’s argument and a roadmap for the PE community to harness the power of AI responsibly, ensuring that technology serves as a tool to enhance, rather than diminish, the human experience of movement and play.

PRESENTATION HIGHLIGHTS

Lucy Mills’s lecture was structured into three distinct parts: an exploration of AI fundamentals, a connection of AI’s potential to the specific context of physical education, and the sharing of practical advice for navigating this new technological landscape. The following sections synthesise the key concepts from each part.

2.1. EXPLORING AI: DEMYSTIFYING THE CURRENT BOOM

The presentation began by defining AI as a broad, interdisciplinary field aimed at creating technologies that can replicate human-like problem-solving and decision-making. Mills traced the history of the field from Alan Turing’s foundational 1950 question, “Can machines think?” [1], through a series of key milestones that demonstrated machines learning to master complex games (IBM’s Deep Blue in 1997), understand natural language (IBM’s Watson in 2011), and perceive the visual world more accurately than humans (ImageNet in 2015).

Mills explained that the current “AI boom,” which follows several earlier “AI winters” where ideas outpaced technological capability, is driven by the convergence of three critical factors:

- 1 **Big Data:** The exponential growth in our ability to capture, store, and process vast and complex datasets from everyday life (e.g., social media interactions, sleep patterns, emails). This data contains the raw material from which AI models can extract insights.
- 2 **Cloud Computing:** The widespread availability of powerful, scalable, and cost-effective computing resources from providers like Amazon, Google, and Microsoft. This has democratised access to the immense processing power required for training sophisticated AI models.
- 3 **Deep Learning Models:** The development of highly sophisticated, brain-inspired algorithms that enable computers to learn from data in a hierarchical fashion, allowing them to perform tasks such as prediction, classification, generation, and analysis with unprecedented accuracy.

This section also provided a taxonomy of different AI types, including Natural Language Processing (NLP), Computer Vision, Speech Recognition, Recommender Systems, and Robotics. Mills identified Generative AI—the ability of AI to create new content—as the primary driver of the most recent wave of public interest and innovation.

2.2. CONNECTING AI TO PE: THE PROMISE AND THE PARADOX

The core of the lecture was the application of these AI concepts to the world of sport and physical education. Mills structured this analysis around a compelling “promise and paradox” framework, highlighting the dual-edged nature of AI-driven innovation.

The promise of AI in PE is fourfold:

- **Personalisation at Scale:** AI can analyse an individual’s progress, learning style, and preferences to deliver tailored feedback and content. An example given was AI Scout, a UK-based platform that uses computer vision to analyse player videos, providing objective feedback and enabling decentralised talent identification.
- **Time-Saving Automation:** AI agents can automate repetitive administrative tasks, freeing up teachers and coaches to focus on human interaction. The example of Clubee, a Luxembourgish company, demonstrated how AI can handle routine club administration like emails and registrations.
- **Enhanced Insights and Decision-Making:** AI can process large datasets to identify patterns that are invisible to the human eye. Twinplay.ai, an Italian basketball analytics platform, was cited as an example of using computer vision to analyse game footage in real time, creating visual summaries and tracking player performance.
- **Compelling Storytelling:** Generative AI can transform dry statistics into engaging narratives and visuals, making sport and PE more relatable and visible, particularly for younger audiences.

However, for each promise, Mills identified a corresponding paradox that demands critical consideration:

- Personalisation vs. Independent Thought: If AI dictates every action and provides constant feedback, does the learner stop thinking for themselves? Over-reliance on AI-driven guidance could stifle creativity, problem-solving, and self-reflection.
- Time-Saving vs. Dependency: While automation is efficient, it can lead to an over-dependency on AI systems, potentially eroding the professional judgment and intuitive expertise of teachers and coaches.
- Better Insights vs. Over-Analysis (The Jevons Paradox): The Jevons paradox states that as a process becomes more efficient, its use tends to increase rather than decrease. In PE, the efficiency of AI in tracking and measurement could lead to an explosion of data analysis, where the focus shifts from the joy of movement to the quantification of performance. Mills posed the critical question: *“If I’m always going to be watched and tracked, will I still enjoy movement?”*
- Engagement vs. Devaluing Effort: If success is defined solely by AI-generated metrics of improvement, does the intrinsic value of effort and participation get lost? The question, *“If AI says I didn’t improve, does that mean my effort doesn’t count?”* highlights the risk of extrinsic data-driven validation overriding internal motivation.

2.3. SHARING ADVICE: A PRACTICAL GUIDE FOR NAVIGATING THE AI ERA

The final section of the lecture provided a series of actionable recommendations for the PE community to navigate the complexities of AI adoption. This guidance was framed as a response to common anxieties, such as the feeling of being overwhelmed by the pace of technological change and uncertainty about where to start.

The key recommendations were:

1. Establish Organisational AI Readiness: AI strategy should not be a bottom-up, ad-hoc process. Senior leadership within schools, clubs, and governing bodies must take the lead in developing a strategic vision for AI that is explicitly aligned with the organisation’s core values and principles. This involves creating clear “guardrails” for AI use.
2. Involve Young People: Educators should actively engage with their students, who are “AI natives” and often have a sophisticated and intuitive understanding of these technologies. Their perspectives are invaluable in shaping how AI is integrated into the learning environment.
3. Adopt a Problem-First Approach: Mills strongly cautioned against adopting “technology for technology’s sake.” Innovation should always start with a specific problem or goal. The critical question to ask is not *“How can we use AI?”* but *“Will AI genuinely improve this specific outcome?”* This principle of discernment is crucial to avoid wasteful or counterproductive implementations.

4. **Pilot Behind the Scenes First:** Before deploying AI tools directly with students or athletes, practitioners should start by using them to automate their own background administrative tasks. This allows them to become familiar with the technology in a low-stakes environment and helps manage the Jevons paradox by ensuring that efficiency gains free up time for high-value human interaction, rather than simply creating more analytical work.
5. **Safeguard Unstructured Play:** A central theme was the need to protect moments of spontaneous, unstructured, and joyful movement from the encroachment of datafication. The goal of AI should be to create more space for this kind of activity, not less.
6. **Address Ethics and Access:** The adoption of AI must be accompanied by a rigorous consideration of ethical issues, including data privacy, algorithmic bias, and equitable access. Organisations must establish clear policies for data governance and be mindful of creating a two-tiered system where only some have access to the benefits of AI.
7. **Embrace a Human-Centred Approach:** Ultimately, AI should be viewed as a tool to support people-led goals. The focus should always be on using technology to amplify positive human interactions and social outcomes, such as collectivism and sustainability, rather than allowing the logic of the technology to dictate the goals.

CONCLUSION:

Lucy Mills’s lecture provides an essential framework for the physical education community as it stands on the precipice of the AI revolution. By moving beyond the simplistic dichotomy of AI as either a panacea or a threat, she offers a path of critical and strategic engagement. The “promise and paradox” framework is a powerful analytical tool that enables educators and leaders to evaluate AI not on its technical capabilities alone, but on its potential impact on human values, pedagogical principles, and the intrinsic joy of movement.

The overarching message is one of agency and discernment. The future of AI in physical education is not something that will simply happen to the field; it is something that the field must actively shape. This requires a proactive and human-centred approach, where the core values of education and well-being guide technological adoption, not the other way around. The call to establish organisational readiness, start with problems rather than solutions, and safeguard the spaces for unstructured play is a crucial corrective to the often-unthinking rush of technological adoption.

For practitioners, the lecture offers a reassuringly pragmatic starting point: begin with small, administrative applications to build familiarity and free up time for what truly matters—human connection. For leaders, it is a call to establish a clear ethical and strategic vision. For the entire PE community, it is a reminder that while AI may be a powerful tool, it is the wisdom, judgment, and human-centred values of the people wielding that tool that will ultimately determine whether it builds a more equitable, engaging, and healthy future for all.