

From Lifelong Learning to Lifelong Active Ageing: Intelligent Systems for Learning, Movement and Well-being

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Abstract: For decades, technology-enhanced education has embraced the vision of lifelong learning. But what happens to our intelligent learning systems when the lifelong learner grows older?

This talk traces the research journey we have been developing at the PhyUM Research Center, from adaptive and personalized learning towards intelligent systems that increasingly incorporate the body, movement and, more recently, active ageing and well-being. Through a series of developments in Human Motion Computing, I will discuss how sensing technologies and artificial intelligence have been progressively integrated into interactive intelligent systems to support learning and adaptation beyond conventional learner interactions.

The SMDD framework (Sensing/Modeling motion, Designing/Delivering feedback) provides a computational perspective on how sensor-based information can be transformed into adaptive support, while the IWA framework (learning IN, WITH and ABOUT movement) characterizes the broader relationships between learning and movement: learning IN movement refers to learning while physically engaged in movement; learning WITH movement considers movement as a resource or means that can support the learning process; and learning ABOUT movement makes movement itself the object of learning, reflection and improvement.

Introducing the lifespan dimension, however, changes the question. As people age, their capabilities, goals, confidence, social contexts and expectations evolve. The challenge is therefore not only to support learning throughout life, but also to reconsider what intelligent systems should model, adapt to and ultimately optimize. Our recent work on active ageing illustrates this transition. Through the participatory EMERGE methodology, we are exploring how human-centered and experiential approaches can inform the design and personalization of intelligent systems for older adults.

This perspective invites us to ask not only how movement can become part of learning, but also what that learning is ultimately for. Moving from lifelong learning to lifelong active ageing calls for rethinking intelligent systems not only as technologies for acquiring and improving knowledge and skills, but also as systems that can support people in maintaining capabilities, autonomy, participation and well-being as they change across the lifespan.

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